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ABSTRACT

This final report describes activities and accomplishments of a 2-year (1987 through 1989) project on the design and evaluation of specific marker and student outcome variables in school learning environments for effective mainstreaming of students with mild disabilities. The report is organized into eight sections; these include a project overview that details the goals and accomplishments of each of the project's three phases and descriptions of the seven deliverables. The three phases of the project were: (1) identification of major factors and variables important to student outcomes; (2) development and validation of the Consensus Marker-Outcome Variable System (CMOVS); and (3) dissemination of findings and use of the CMOVS. The seven deliverables included in the report are: (1) a master list of variables included in the CMOVS and their definitions; (2) a meta-review of the research literature on variables important to learning; (3) variables important to learning as rated by professionals in the field; (4) research design, measurement methodologies, and procedures utilized; (5) a second study of variables important to learning; (6) a decision-making framework for descriptions of innovative education programs; and (7) a checklist for description of features of programs that aim to accommodate mainstreamed special education students effectively in regular education settings. (Individual components contain extensive references.) (DB)

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ED 405 690

Designing and Evaluating School Learning Environments for Effective Mainstreaming of Special Education Students: Synthesis, Validation, and Dissemination of Research Methods

FINAL REPORT
(September 1, 1987 - December 31, 1989)

Submitted by
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Temple University Center for Research
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March, 1990

EC305400

INTRODUCTION

The purpose of this report is to provide a final summary of activities and accomplishments of the project, "Designing and Evaluating School Learning Environments for Effective Mainstreaming of Special Education Students: Synthesis, Validation, and Dissemination of Research Methods," covering the period from September 1, 1987 to December 31, 1989.

The report is organized in eight sections: a project overview detailing the goals and accomplishments of each of the project's three phases, and Deliverables 1-A, 3-A, 3-B, 3-C, 3-D, 3-E and 3-F. (Deliverable 2-A, an Interim Progress Report providing a summary of major activities and tasks completed during the period of September 1, 1998 through August 31, 1989, was completed and submitted to OSEP in October 1989). These Deliverables were identified in the original proposal and modified based on discussions during the site visit by OSEP officials in September 1989.

The document below outlines the tasks and deliverables that were included in our transmittal to OSEP of January 25,1990.

Tasks Earmarked for Completion During the No-cost Extension Period

(September 1, 1989 - December 31, 1989)

Four major categories of tasks were targeted for completion during the requested no-cost extension period. This document provides: (a) a brief description of the specific tasks and deliverables expected to be completed during the no-cost extension period, (b) a person loading chart on the amount of time the specific project staff would devote to completing the various tasks and deliverables, and (c) a budget breakdown for supporting the completion of the project tasks and deliverables during the no-cost extension period.

Description of Tasks and Deliverables

Task 1:

Complete a master list of definitions of the variables included in the consensus marker-outcome variable system (CMOVS).

> Deliverable 1-A: A document providing a brief overview of the purpose and design of the CMOVS and definitions of all of the variables included in the CMOVS. The listing of the variables and their definitions are organized under the six major categories and 30 sub-categories of the CMOVS.

Task 2:

Complete an Interim Progress Report of the project's work for submission to OSEP.

> Deliverable 2-A: An Interim Progress Report was completed and submitted to OSEP. This report provides a summary of major activities and tasks completed during the period of September 1, 1988 through August 31, 1989.

Task 3:

Complete project deliverables (see Table 5 on page 40 of the project's Year 2 proposal). The originally proposed deliverables were subsequently modified and discussed at the September 7, 1989 site visit. A revised list was included in the Appendix of our September 10, 1989 summary of the site visit discussion. The following is a list of completed deliverables.

> Deliverable 3-A: A report entitled "Variables Important to Learning: A Meta-review of Reviews of the Research Literature." This final report was written for the research audience. It incorporates comments and suggestions from the technical and stakeholder review panels in response to a draft paper reporting the findings from the meta-review.

> Deliverable 3-B: A paper entitled "Variables Important to Learning: A Consensus from the Field." This paper reports findings from the survey

study and discusses the implications of the findings for research and practice in improving instruction and learning for students in special education programs and students considered at risk of being identified as requiring special education services. The final version of the paper incorporates the feedback and comments of the technical and stakeholder panels.

Deliverable 3-C: A research paper on the findings of an interview study of the instrumentation, measurement procedures, and research design used by 30 OSEP funded research projects. This deliverable was based on findings from the interview study. The paper provides a summary of the research design, measurement methodologies, and procedures utilized by senior investigators of research projects funded by OSEP to develop a knowledge base for improving learning for special education students integrated in regular education settings.

Deliverable 3-D: A paper summarizing the major findings of the project's work entitled "Variables that are Important to Learning: A Knowledge Base for Special and Regular Education." The purpose of this paper is to provide an overview of the project and to summarize major findings from the meta-review and the consensus from the field based on the survey study. The paper is for the practitioner and policy maker audience.

Deliverable 3-E: A paper providing an illustration of using the CMOVS as a framework to communicate the program design emphasis of specific programs/practices, and/or as a guiding framework for developing programs aiming to provide for the diverse learning needs of special education students integrated in regular education settings. This deliverable was written for the practitioner audience, particularly program developers.

Deliverable 3-F: A check list for describing and documenting salient program features based on the CMOVS framework. This deliverable aims to provide an illustration of using the CMOVS framework for systematic description and analysis of characteristic features of programs serving special education students in regular education settings. It is important to note that the purpose of this deliverable is to illustrate an application of the CMOVS as a conceptual framework for enhancing communication and/or for describing program features and analyzing program implementation needs.

Task 4:
Dissemination of the work of the project.

Activity 4.1: Conduct cooperative technical assistance workshops.

A technical assistance workshop on the CMOVS was held at a regional meeting for instructional leaders on October 11-12, 1989.

Activity 4.2: Develop a strategic plan to disseminate the project's work to researcher and practitioner audiences.

In addition to targeting specific written products of the project for publication in journals with wide circulations to researcher or practitioner audiences, the plan also includes submitting proposals for presentations at national meetings and finding support for hosting invitational conferences with different stakeholder groups (e.g., administrators, teachers, policy makers).

PROJECT OVERVIEW

The primary task of this project was to obtain consensus among researchers, leading practitioners, policymakers, teacher educators, and parents on specific marker and student outcome variables relevant to providing effective education for mildly handicapped and learning disabled students in general education classroom settings. Mildly handicapped students in the context of the project's work include students classified as educable mentally retarded (EMR), learning disabled (LD), and emotionally disturbed (ED), but not psychotic or autistic; plus those with limited physical and sensory impairments, but who do not have additional severely disabling conditions. The term also encompasses students with language development problems (in first or primary language) of less than severe degree; many such students are classified in the schools as having language or speech problems.

A basic premise underlying the project design was that important changes in the research base are emerging and the extant data base needed to be examined to address such instructional design questions as: what aspects of school and instruction enhance student learning; what kinds of social relationships are important in a learning context for students with mild handicaps and learning disabilities in general education classroom environments; what characteristics of learners are important in the context of learning for students with mild handicaps and learning disabilities in general education classroom environments; and, what characteristics of learners are important to observe and consider when arranging instruction.

The overall expected outcome of the project was the development of a systematic framework to facilitate increased communication among professionals in research, innovative program development, policy making, and the provision of education and related services. Increased communication is expected, in turn, to lead to improved services for all students, including, and especially, those students who require greater-than-usual special education and related service support.

The project's work was designed to be carried out in three phases. The primary task of Phase I was the identification of major factors and variables that are important to student learning. The expected outcome of the Phase I work was the development of a comprehensive list of marker and outcome variables that can be used as guidelines for the design and evaluation of programs aimed at providing effective educational and related services for students with mild handicaps and learning disabilities in general education settings. This work consisted of a two-step process of "synthesizing the evidence." The first step involved conducting a comprehensive analysis of the extant effectiveness research on teaching and learning and the research on special education. The second step of Phase I involved synthesizing evaluations of the state of practice by eminent researchers, scholar-practitioners, and administrators/instructional leaders.

The second phase of the project's work involved the development and validation of the Consensus Marker-Outcome Variable System (CMOVS). Among the expected outcomes of this aspect of the project's work were the validation of the CMOVS, based on the research literature and expert opinions, and ways to use the CMOVS as a framework for improved communication among professionals concerned with variables important to learning efficiency and effectiveness of students in general, and special education students in general education settings.

The third phase of the project's work involved the dissemination of the findings and use of the Consensus Marker-Outcome Variable System as a means of improving communication among researchers, practitioners, policymakers, and parents.

PROJECT ACCOMPLISHMENTS

The major goals and accomplishments of each phase of the project are summarized in the following sections.

Phase I: Identification and Selection of Specific Variables Reported in the Research Literature

Goals

The major goal of Phase I work was the development of a marker and outcome variable framework that could be used as a guideline for design and evaluation of programs aimed at providing effective educational and related services for students with mild handicaps and learning disabilities in general education settings. The primary task during Phase I of the project was the identification of major factors and variables that are important to student learning.

Work by the project staff during the initial six months consisted of a two-step process of synthesizing the evidence, namely, (1) the identification of major factors and variables that are important to student learning, and (2) the synthesis evaluation of the state of practice by eminent researchers, scholar-practitioners, and administrators/ instructional leaders. This Phase was described in detail in an earlier Interim Report for that period (dated September 1, 1987 - February 29, 1988).

Specifically, the project staff focused on completing the following tasks: (a) establishing the Technical Review Panel and the Stakeholder Advisory Panels; (b) making the preliminary selection of the synthesis literature; (c) developing the preliminary analytic framework; (d) revising the analytic framework, based on the feedback from the Technical Review Panel; (e) developing the pilot edition of the variable rating scale; and (f) analyzing the results of pilot ratings by the four Stakeholder Advisory Panels.

Accomplishments

Establish the Technical Review Panel. The Technical Review Panel was established at the inception of the project. The primary function of the Panel was providing technical advice to the principal investigator and the project staff on the development and validation of findings from the research synthesis, on the development of the analytic framework, and on the Consensus Marker-Outcome Variable Rating System. Criteria for the selection of persons to serve on the Technical Review Panel included: (a) national reputations as researchers and/or scholar-practitioners in their respective fields, and (b) expertise in one or more areas of research on effective teaching and schooling, special education, the study of students with special learning needs (i.e., students identified as mildly handicapped, learning disabled, academically-at-risk, or low-achieving), program evaluation, measurement and instrumentation development, and research review and synthesis methodology.

Select the preliminary synthesis literature. The data source for the research synthesis was identified through several means. Office of Special Education Programs (OSEP) staff were consulted to develop a list of current and recently completed projects funded by OSEP that included major reviews of research or research syntheses on themes related to project concerns. During the first month of the project, the principal investigator contacted the directors of these projects, who provided references to potential data sources.

ERIC searches also were made for regular and special education research and meta-analyses. In addition, members of the Technical Review Panel were asked to provide nominations for literature reviews after their first review of the preliminary selection of synthesis literature.

Review the preliminary selection of synthesis literature. The Technical Review Panel reviewed the candidate data sources for the proposed synthesis, concentrating on the comprehensiveness and quality of the preliminary list of variables that was identified by the project staff. The Panel also commented on areas that they judged to be inadequately represented and provided additional references for the preliminary list.

Develop the preliminary analytic framework. Drawing upon previous research reviews and research syntheses such as What Works (U.S. Department of Education, 1986), the Handbook of Special Education: Research and Practice

(Wang, Reynolds, and Walberg, 1987), and the Handbook of Research on Teaching (Wittrock, 1986), a preliminary analytic framework of the variables important to learning was developed to organize the synthesis data. This document incorporates the best thinking from both the general education and special education perspectives.

The categories chosen for the framework were guided by general analytic considerations as well as their appropriateness for special education. With respect to general considerations, for example, the first-order and second-order categories are comprehensive and inclusive, yet as mutually exclusive and unduplicative as possible. The category labels are concise and reveal to practitioners specific educational actions, while at the same time are operationally defined in some detail. The language chosen speaks tellingly to general and special educators and avoids jargon whenever possible, while still accurately and validly reflecting research content. (It is important to note here, however, that readers will be able to pursue any category point included in the final framework document -- first to the reviews and syntheses, and from these -- if they wish -- to original primary studies.)

Marker and outcome variables referenced in each of the initial data sources were noted. These variables were then grouped with similar variables, and after several iterations, seven broad categories were formed. They are: (a) state and district context; (b) extra-school context; (c) school level characteristics; (d) student characteristics; (e) program design, (f) implementation, classroom processes, and classroom climate; and (g) additional variables related to learning.

The initial identification of variables required revision. Some categories needed to be expanded, and the organization of the clusters and subclusters of variables needed to be refined. However, an effort was made to provide mutually exclusive and exhaustive classifications, especially at the levels of the seven categories and the major clusters. In constructing the seven categories, the major concern was to provide adequate coverage of alterable variables. However, a limited number of demographic, or "background," variables were included because of their widespread use throughout the literature.

Review the preliminary analytic framework. The preliminary analytic framework was sent to both the Technical Review Panel and to the Chairpersons of the four Stakeholder Advisory Panels for feedback.

Revise the analytic framework. The Delphi Technique was used to develop the data base for the design and refinement of the analytic framework. Data from the initial feedback (ratings) from the panel of experts (Technical Review Panel and chairpersons of the four Stakeholder Advisory Panels) were coded and analyzed to serve as the basis for a second round of validation by the Panel.

The results of the individual experts' ratings and the group mean, as well as specific feedback and suggestions from the individual raters, were included in the information packet that was sent to the twelve experts who participated in the first round of ratings. They were asked to review all of the results and comments and decide if they wanted to make changes in their ratings or comment on the other experts' suggestions. Findings from the two rounds of ratings were part of the data base for completing the refinement of the analytic framework.

Phase II: Development and Validation of the Consensus Marker-Outcome Variable Rating Scale

Goals

The focus of the Phase II work was the development of the Consensus Marker-Outcome Variable System (CMOVS). The CMOVS was designed as a framework for collecting data to describe, monitor, and evaluate program implementation. The major goal of the project's Phase II was a finalized version of the Consensus Marker-Outcome Variable System, based on the groundwork completed on the preliminary analytic framework during Phase I. This work included surveying expert researchers to examine the variables they selected as important to learning in their studies and arraying them against variables included in CMOVS framework.

Accomplishments

Review the research base. The project staff conducted a systematic literature review of the research base on variables that are important to learning, using the CMOVS as a guiding framework. Systematic analysis of 179 hanndbook and annual review chapters, commissioned papers, and other authoritative reviews of both regular and special education research literature was carried out. A computerized coding scheme was developed to record and retrieve information from this review. See Deliverable 3-A, "Variables Important to Learning: A Meta-Review of Reviews of the Research Literature."

Survey the measures and instruments used by thirty OSEP-funded projects. In our original project proposal, one of the deliverables for this project was described as including development of a technical report on the construct, psychometric and use pattern related to instruments and measures used by SEP-funded projects. This proposed task to develop a manual of candidate measures and instruments was altered based on concerns and recommendations from members of our Technical Review Panel and response from senior researchers of the thirty SEP-funded projects (grantees of the 84.023K and 84.023FL awards). In addition, there were concerns expressed by the OSEP staff on the design and use of such a document. It was felt that producing such a document as a reference resource for the field for making selection decisions on measures and instrumentation would be subject to misinterpretation and strong criticism by researchers and practitioners. These changes resulted in delaying completion of this task.

The principal investigators of the thirty OSEP-funded projects were invited to attend a series of conferences to discuss assessment and instrumentation issues in the study of the design and effects of school programs designed to integrate students with special needs in general education settings. The first conference was held at the Temple University Center for Research in Human Development and Education in January, 1988. Three subsequent conferences were held in conjunction with CEC and AERA annual meetings.

Based on the discussion and recommendations of participants at these conferences, a survey was designed to collect information on measures and instruments being used by grantees of the 84.023K and 84.023F1 projects.

Using a structured interview protocol, data was collected by telephone from 31 projects funded for their first year between 1985 and 1988 by the Office of Special Education and Rehabilitative Services. Each interview focused on questions related to the major variables and measurement methodologies utilized by the funded research studies. See Deliverable 3-C, "Research Design, Measurement Methodologies and Procedures Utilized by OSEP-Funded Projects" for a complete description of the work of developing and validating the CMOVS through surveying principal investigators of currently-funded projects.

Survey the opinions of stakeholders using CMOVS. The survey of opinions from stakeholders was sent to six groups of stakeholders: special education teachers, general education teachers, principals, school psychologists, researchers, and state directors of special education or Chapter 1 programs. The first round of surveys was sent out in November 1998; the second round was sent out in January 1989; and the third round was sent out in April 1989. Findings from the survey are summarized in several deliverables. See Deliverable 3-B, "Variables Important to Learning: A Consensus from the Field", Deliverable 3-D, "Variables Important to Learning: A Knowledge Base for Special and Regular Education", and Deliverable 3-E, "A Decision-Making Framework for Description of Innovative Education Programs."

Review of the drafts of the project's deliverables. Drafts of the project's deliverables were sent to the project's Technical Review Panel and stakeholder advisory board for review and suggestions. The appendix to this document includes the list of reviewers and their comments on the various papers.

Phase III: Development and Implementation of a Broader Dissemination Plan

Goals

The primary goal of this final phase of the project was to establish a systematic plan for disseminating information about the outcomes of our research.

Our dissemination plan was targeted for three specific audiences: researchers and program developers interested in the design, implementation, and evaluation of innovative alternatives for accommodating students with special needs; practitioners interested in effectively serving mildly handicapped and learning disabled students in general education classrooms; and program evaluation staff from LEAs and SEAs interested in maximizing their resources for providing improved educational services for all students.

The design of the dissemination plan was based on the premise that communication about the research base and practical knowledge of effective school programs can only be increased if the project's findings become known, understood, and used. In a real sense, dissemination was a built-in component in the work of all three project phases. For example, through the involvement of the Technical Review Panel and the Stakeholder Advisory Panel, the project's work has been guided, evaluated, and disseminated by nationally and internationally known researchers; federal, SEA, and LEA policymakers; practitioners; and teacher educators. These collaborators also constitute an ongoing informal network for disseminating information about the project's progress and findings.

In addition to informal efforts to disseminate information about the project, a variety of strategies was used in carrying out our dissemination tasks. They included technical assistance workshops, national invitational conferences, and presentations of project findings at meetings of professional organizations.

Accomplishments

Cooperative technical assistance workshops. A series of cooperative technical assistance workshops were targeted for research, scholar and practitioner audiences. The twofold purpose of these workshops was to discuss the major research findings from the project's work and to obtain feedback on the application of the CMOVS.

A national invitational conference. In addition to the conferences on issues and concerns of methodology and instruments for research on implementation and efforts of programs designed to serve special needs students in the regular education setting, a national invitational conference was held in Washington, D.C. in conjunction with the annual meeting on educational leadership sponsored by the Institute for Educational Leadership (IEL) on December 6 - 9, 1989, to report the work of the project and solicit comments and suggestions about alternative ways to disseminate information on the project's findings. We invited professionals in strategic positions and asked their advice and assistance in disseminating the work of the project. Among the categories of people invited were leading researchers in special education and related fields, journal editors, teacher educators and those who hold a variety of leadership positions in school systems around the country, instructional leaders, and policy makers (superintendents, directors of special education, directors of curriculum and instruction, directors of staff development, etc.) Holding the conference in Washington, D.C. had the additional advantage of allowing us to invite relevant staff members of the various professional organizations and whose headquarters are located in Washington. It is important to note that although this conference was designed as a dissemination activity to solicit feedback on the project's work from the field, project funds were not used to support this conference.

Develop a systematic plan to disseminate the project's written products to researcher and practitioner audiences. A systematic plan is being developed for submitting the written products of this project to professional journals for publications in order to rach a variety of audiences. Among the candidates are journals such as American Educational Research Journal, Educational

Leadership, Educational Researcher, Elementary School Journal, Exceptional Children, Review of Educational Research, and Teaching Exceptional Children. Decisions regarding specific journals and topics for submission were based on the priority of reaching a variety of stakeholders and maximizing the potential of this dissemination strategy.

The principal investigator and the senior research staff are collaborating as co-authors on a summary volume that is based on the final findings of this project. The volume will include discussions of all three phases of the work. Project staff are exploring the possibilities for publication of the summary volume as a book or monograph through one of the national professional organizations.

Present project findings at meetings of professional organizations. Senior project staff made presentations on the analysis of our synthesis work at regular national meetings of professional organizations. Project staff continue to seek opportunities to disseminate the work of the project through participation in national and regional meetings. We have submitted proposals for presenting the project's work at relevant professional meetings, even though the actual presentations will take place after the project's ending date. The principal investigator has identified other funding sources to support such discussants' activities.

Identify specific ways the CMOVS can be used as a guiding framework for identifying and describing research variables and for making program development and program evaluation decisions. The outcome of this aspect of the project's work was to delineate possible applications of findings from the synthesis of the research literature and consensus from the field to facilitate increased communication among professionals in research, innovative program development, and evaluation of education and related services.

We identified several ways of applying the CMOVS, based on discussions with researchers and practitioners during several presentations of the project's work at national and regional meetings of professional organizations. One example is the use of the CMOVS as a design framework for program development and developing aspects of design and implementation of innovative programs to provide systematic information base for program selection purposes. The CMOVS is currently being used in the design of several studies by selected collaborating researchers as the result of cooperative technical assistance workshops held by the project staff. Feedback from their work was incorporated into a paper on the rationale and design of selected applications of the CMOVS as an organizing framework for program development and evaluation -- see Deliverable 3-E, "A Decision-Making Framework for Description of Innovative Education Programs."

Another example of possible applications of the CMOVS is as a basis for a checklist for descriptions of program implementation. Based on the CMOVS and a previously designed classroom observation program implementation schedule (Reynolds, 1989), a checklist was developed to serve as a guiding framework for identifying the presence and absence of critical features of effective mainstream learning environments for students with disabilities. This instrument was pilot tested by several collaborating researchers in conjunction with their studies of classroom environments for effective integration of special education services and students in regular education settings. See Deliverable 3-F, "A Checklist for Description of Features of Programs that Aim to Effectively Accommodate Mainstreamed Special Education Students in Regular Education Settings" for the full description and results of this work.

DELIVERABLES

1-A "Master List of Variables Included in the CMOVS and Their Definitions"

3-A "Variables Important to Learning: A Meta-Review of Reviews of the Research Literature"

3-B "Variables Important to Learning: A Consensus from the Field"

3-C "Research Design, Measurement Methodologies, and Procedures Utilized by OSEP-Funded Projects"

3-D "Variables Important to Learning: A Knowledge Base for Special and Regular Education"

3-E "A Decision-Making Framework for Description of Innovative Education Programs"

3-F "A Checklist for Description of Features of Programs that Aim to Effectively Accommodate Mainstreamed Special Education Students in Regular Education Settings"

DELIVERABLE 1-A

DELIVERABLE 1-A

Master List of Variables Included in the CMOVS and Their Definitions

MASTER LIST OF VARIABLES INCLUDED IN THE CMOVS AND THEIR DEFINITIONS

developed by

Temple University Center for Research
in Human Development and Education

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INTRODUCTION

The consensus marker-outcome variable system, referred to as CMOVS, was developed as a result of a comprehensive meta-review and synthesis of research on variables considered to be important to learning, and subsequent validation based on a survey designed to obtain a consensus from the field.

The following is a master list of the definitions of the major categories of variables that are considered important to learning and the specific variables included under each category. The six major categories of variables are as follows: (a) State and District Variables, (b) Out of School Contextual Variables, (c) School Level Variables, (d) Student Variables, (e) Program Design Variables, and (f) Implementation, Classroom Instruction and Climate Variables.

Master List of Variables and Their Definitions

Category I. State and District Variables:

These are variables associated with state and district level school governance and administration. They include state curriculum and textbook policies, testing and graduation requirements, and teacher licensure; as well as specific provisions in teacher contracts, and some district-level administrative and fiscal variables.

I-A. District Level Demographics and Marker Variables

1. School district size
2. Degree of school district bureaucratization
3. Degree of school district centralization
4. Presence of contractual limits on after-school meetings
5. Limits on class size
6. Presence of contractual restrictions on activities performed by aides
7. Degree of central office assistance and support for programs
8. Degree of board of education support for instructional programs
9. Per pupil expenditure
10. Efficiency of transportation system

I-B. State Level Policy Variables

1. Teacher licensure requirements
2. Degree of state control over textbooks
3. Degree of state control over curriculum
4. Academic course and unit requirements
5. Minimum competency test requirements
6. Adherence to least restrictive environment/mainstreaming

Master List of Variables and Their Definitions

Category II. Out of School Contextual Variables:

These are variables associated with the home and community contexts within which schools function. They include community demographics, peer culture, parental support and involvement, and amount of time students spend out-of-school on such activities as television viewing, leisure reading, and homework.

II-A. Community Variables

1. Socioeconomic level of community
2. Ethnic mix of community
3. Quality of social services for students

II-B. Peer Group Variables

1. Level of peers' academic aspirations
2. Level of peers' occupational aspirations
3. Presence of well defined clique structure
4. Degree of peers' substance abuse
5. Degree of peers' criminal activity

II-C. Home Environment and Parental Support Variables

1. Educational environment (e.g., number of books and magazines at home)
2. Parental involvement in assuring completion of homework
3. Parental involvement in assuring regular school attendance
4. Parental monitoring of student television viewing
5. Parental participation in school conferences and related activities
6. Parental application of appropriate, consistent discipline
7. Parental expression of attention to children
8. Parental interest in student's school work
9. Parental expectation for academic success

II-D. Student Use of Out of School Time Variables

1. Student participation in clubs and extracurricular school activities
2. Amount of time spent on homework
3. Amount of time spent on leisure reading
4. Amount of time spent viewing educational television
5. Amount of time spent viewing noneducational television

Master List of Variables and Their Definitions

Category III. School Level Variables:

These are variables associated with school-level demographics, culture, climate, policies, and practices. They include demographics of the student body, whether the school is public or private, levels of funding for specific categorical programs, school-level decision making variables, and specific school-level policies and practices, including policies on parental involvement in the school.

III-A. Demographic and Marker Variables

1. Public versus private school
2. Size of school
3. Level of Chapter I (compensatory education) funding
4. Level of Title VII (bilingual) funding
5. Level of PL 94-142 (handicapped) funding
6. Mix of socioeconomic levels in the school
7. Mix of cultural/ethnic groups in the school
8. Mix of student language backgrounds in the school

III-B. Teacher/Administrator Decision Making Variables

1. Teacher and administrator consensus on school values, norms, and roles
2. Principal actively concerned with instructional program
3. Teacher involvement in curricular decision making
4. Teacher involvement in instructional decision making
5. Teacher involvement in resource allocation decisions
6. Teacher involvement in finding ways to increase academic performance

III-C. School Culture Variables (Ethos Conducive to Teaching and Learning)

1. Use of cooperative, not exclusively competitive, goal structures
2. School-wide emphasis on and recognition of academic achievement
3. Low staff absenteeism
4. Low staff turnover
5. Low staff alienation
6. Active collaboration between regular classroom teachers and special education teachers
7. Safe, orderly school climate
8. Degree of school personnel professional collaboration

Category III. School Level Variables: (continued)

III-D. School-Wide Policy and Organizational Variables

1. Presence of "effective schools program"
2. Explicit school grading and academic progress policies
3. Explicit school-wide discipline policy
4. Explicit school-wide attendance policy
5. Coordination of pullout programs for handicapped students with regular instructional programs
6. Use of multi-age grouping
7. Use of instructional teaming
8. Use of cross-age tutoring
9. Use of peer tutoring
10. Use of academic tracking for specific school subject areas
11. Minimization of external classroom disruptions (e.g., broadcast announcements)
12. Adherence to least restrictive environment/mainstreaming
13. Minimum use of suspension and expulsion as discipline tools

III-E. Accessibility Variables

1. Accessibility of educational program (overcoming architectural, communication, and environmental barriers

III-F. Parental Involvement Policy Variables

1. Parental involvement in improvement and operation of instructional programs
2. School-sponsored parenting skills workshops (e.g., behavior modification, parent effectiveness training)

Category IV. Student Variables:

These are variables associated with individual students themselves, including demographics, academic history, and a variety of social, behavioral, motivational, cognitive, and affective characteristics.

IV-A. Demographic and Marker Variables

1. Chronological age
2. Socioeconomic status
3. Gender
4. Ethnicity
5. First or native language
6. Physical and health status
7. Special education classifications (e.g., EMR, LD)

IV-B. History of Educational Placements

1. Prior grade retentions
2. Prior special placements
3. Current placement in regular class versus self-contained special education class

IV-C. Social and Behavorial Variables

1. Positive, nondisruptive behavior
2. Appropriate activity level
3. Cooperativeness with teacher
4. Cooperativeness with peers
5. Ability to make friends with peers

IV-D. Motivational and Affective Variables

1. Attitude toward school
2. Attitude toward teachers
3. Attitude toward subject matter instructed
4. Motivation for continual learning
5. Independence as a learner
6. Perseverance on learning tasks
7. Self-confidence
8. Academic self-competence concept in subject area instructed
9. Attributions for success and failure in subject area instructed

Category IV. Student Variables: (continued)

IV-E. Cognitive Variables

1. Piagetian stage of cognitive development
2. Level of reasoning (fluid ability)
3. Level of spatial ability
4. Memory
5. Level of general academic (crystallized) knowledge
6. Level of specific academic knowledge in subject area instructed
7. Level of reading comprehension ability
8. Level of writing ability
9. Level of computational ability
10. Level of oral fluency
11. Level of listening skills
12. Learning styles (e.g., field independent, visual/auditory learners, high cognitive complexity)

IV-F. Metacognitive Variables

1. Self-regulatory, self-control strategies (e.g., control of attention)
2. Comprehension monitoring (planning: monitoring effectiveness of attempted actions; monitoring outcomes of actions; testing, revising, and evaluating learning strategies)
3. Positive strategies for coping with failure
4. Positive strategies to facilitate generalization of concepts

IV-G. Psychomotor Variables

1. Psychomotor skills specific to area instructed

Master List of Variables and Their Definitions

Category V. Program Design Variables:

These are variables associated with instruction as designed, and with the physical arrangements for its delivery. They include the instructional strategies specified by the curriculum, and characteristics of instructional materials.

V-A. Demographic and Marker Variables

1. Size of instructional group (whole class, small group, one-on-one instruction)
2. Proportion of students with special needs served in regular classes
3. Number of classroom aides required
4. Resources needed

V-B. Curriculum and Instructional Variables

1. Clearly presented academic, social, and attitudinal program goals/outcomes
2. Use of explicit goal/objective setting for instruction of individual student (e.g., Individualized Educational Plans (IEPs))
3. Use of mastery learning techniques, including use of instructional cues, engagement, and corrective feedback
4. Use of cooperative learning strategies
5. Use of personalized instructional program
6. Use of prescriptive instruction combined with aspects of informal or open education
7. Use of diagnostic-prescriptive methods
8. Use of computer-assisted instruction
9. Use of crisis management techniques to control classroom disruptiveness
10. Use of program strategies for favorable affective climate
11. Alignment among goals, contents, instruction, assignments and evaluation
12. Curriculum units integrated around key discipline-based concepts
13. Use of multidisciplinary approaches to instructional planning (including diagnosis in educational planning)
14. Presence of information in the curriculum on individual differences and commonalities (including handicapping conditions)
15. Presence of culturally diverse materials in the curriculum

Category V, Program Design Variables, continued

V-C. Curriculum Design Variables

1. Materials employ alternative modes of representation
2. Material is presented in a cognitively efficient manner
3. Materials employ explicit and specific objectives
4. Materials employ advance organizers
5. Materials employ learning hierarchies
6. Materials are tied to assessment and diagnostic tests
7. Availability of materials and activities prepared specifically for use with whole classroom, small groups, or one-on-one instruction
8. Degree of structure in curriculum accommodates needs of different learners
9. Student interests guide selection of a significant portion of content
10. Availability of materials and activities for students with different abilities
11. Availability of materials and activities for students with different learning styles
12. Developmental issues considered
13. Student experiences considered

Category VI. Implementation, Classroom Instruction, and Climate Variables:

These are variables associated with the implementation of the curriculum and the instructional program. They include classroom routines and practices, characteristics of instruction as delivered, classroom management, monitoring of student progress, and quality and quantity of instruction provided, as well as student-teacher interactions and classroom climate.

VI-A Classroom Implementation Support Variables

1. Creation and maintenance of necessary instructional materials
2. Adequacy in the configuration of classroom space
3. Availability of classroom aides
4. Use of written records to monitor student progress
5. Establishing efficient classroom routines and communicating rules and procedures
6. Developing student self-responsibility for independent study and planning of one's own learning activities

VI-B Classroom Instructional Variables

1. Prescribing individualized instruction based on perceived match of type of learning tasks to student characteristics (e.g., ability, learning style)
2. Use of procedures requiring rehearsal and elaboration of new concepts
3. Use of clear and organized direct instruction
4. Systematic sequencing of instructional events and activities
5. Explicit reliance on individualized educational plans (IEPs) in planning day-to-day instruction for individual students
6. Use of instruction to surface and confront student misconceptions
7. Use of advance organizers, overviews, and reviews of obejctives to structure information
8. Clear signaling of transitions as the lesson progresses
9. Significant redundancy in presentation of content
10. Teacher conveys enthusiasm about the content
11. Directing students' attention to the content
12. Using reinforcement contingencies
13. Setting and maintaining clear expectations of content mastery
14. Providing frequent feedback to students about their performance
15. Explicitly promoting effective metacognitive learning strategies
16. Promoting learning through student collaboration (e.g., peer tutoring, group work)
17. Corrective feedback in event of student error
18. Flexible grouping that enables students to work to improve and change status/groups
19. Teaching for meaningful understanding
20. Degree to which student inquiry is fostered
21. Scaffolding and gradual transfer of responsibility from teacher to student
22. Degree to which assessment is linked with instruction
23. Skills taught within the context of meaningful application
24. Good examples and analogies to concretize the abstract and familiarize the storage
25. Consideration of the teacher's use of language in the instructional process
26. Explicitly promoting student self-monitoring of comprehension

Master List of Variables and Their Definitions

Category VI. Implementation, Classroom Instruction, and Climate Variables: (continued)

VI-C. Quantity of Instruction Variables

1. Length of school year
2. Length of school day
3. Time on task (amount of time students are actively engaged in learning)
4. Time spent in direct instruction on basic skills in reading
5. Time spent in direct instruction on basic skills in mathematics
6. Time allocated to basic skills instruction by regular classroom teacher
7. Time allocated to basic skills instruction by special education teacher
8. Difference between academic learning time and allocated learning time
9. Time spent out of school on homework
10. Time spent out of school viewing educational television
11. Time spent out of school in informal learning experiences (e.g., museum trips, scouts)
12. Nature of regular classroom content missed by students during participation in pullout programs

VI-D. Classroom Assessment Variables

1. Use of assessments to create detailed learner profiles rather than simple classifications or unlaborated total scores
2. Use of assessment as a frequent, integral component of instruction
3. Accurate, frequent measurement of basic skills in reading
4. Accurate, frequent measurement of basic skills in mathematics

VI-E. Classroom Management Variables

1. Minimal disruptiveness in classroom (e.g., no excessive noise, no students out of place during instructional activities, no destructive activities)
2. Group alerting (teaching uses questioning/recitation strategies that maintain active participation by all students)
3. Learner accountability (teacher maintains student awareness of learning goals and expectations)
4. Transitions (teacher avoids disruptions of learning activities, brings activities to a clear and natural close, and smoothly initiates new activity)
5. Teacher "withitness" (teacher is continually aware of events and activities and minimizes disruptiveness by timely and nonconfrontational actions)

Category VI. Implementation, Classroom Instruction, and Climate Variables: (continued)

VI-F. Student and Teacher Interactions: Social Variables

1. Student initiates positive verbal interactions with other students and with teacher
2. Student responds positively to questions from other students and from teacher
3. Teacher reacts appropriately to correct and incorrect answers
4. Teacher reinforces positive social interactions with students rejected by peers
5. Teacher provides explicit coaching on appropriate social behaviors
6. Teacher provides explicit coaching to reduce aggression

VI-G. Student and Teacher Interactions: Academic Variables

1. Teacher asks academic questions frequently
2. Teacher asks questions predominantly low in difficulty
3. Teacher asks questions that are predominantly low in cognitive level
4. Teacher maintains high post-question wait time
5. Frequent calls for extended, substantive oral and written response (not one-word answers)

VI-H. Classroom Climate Variables

1. Cohesiveness (members of class are friends sharing common interests and values and emphasizing cooperative goals)
2. Low friction (students and teacher interact in a considerate and cooperative way, with minimal abrasiveness)
3. Low cliqueness (students work with many different classmates, and not just with a few close friends)
4. Satisfaction (students are satisfied with class activities)
5. Speed (the pacing of instruction is appropriate for the majority of the students)
6. Task difficulty (students are continually and appropriately challenged)
7. Low apathy (class members are concerned and interested in what goes on in the class)
8. Low favoritism (all students are treated equally well in the class, and given equal opportunities to participate)
9. Formality (students are asked to follow explicitly stated rules concerning classroom conduct and activities)
10. Goal direction (objectives of learning activities are specific and explicit)
11. Democracy (all students are explicitly involved in making some types of classroom decisions)
12. Organization (class is well organized and well planned)
13. Diversity (the class divides its efforts among several different purposes)
14. Environment (needed or desired books and equipment are readily available to students in the classroom)
15. Competition (students compete to see who can do the best work)

DELIVERABLE 2-A

Interim Progress Reports: Delivered to OSEP

NOTE: These reports are not included here, since they were submitted to OSEP in February 1988 and October 1989, respectively.

DELIVERABLE 3-A

DELIVERABLE 3-A

Variables Important to Learning: A Meta-Review of Review of the Research Literature

VARIABLES IMPORTANT TO LEARNING: A META-REVIEW OF REVIEWS OF THE RESEARCH LITERATURE

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Abstract

This paper reports a comprehensive "meta-review" and synthesis of research on variables related to learning, including both cognitive and affective schooling outcomes. A conceptual framework was developed, encompassing 228 items related to school learning, organized _a priori_ into 30 scales within six categories. Search and selection procedures yielded 179 selected handbook and annual review chapters, commissioned papers, and other authoritative reviews. Content analysis yielded over 3,700 ratings of the strength of influence of the variables on learning. They confirm the primacy of student, classroom, home, and community influences on learning relative to more distal policy variables such as state and district characteristics. They also highlight the importance of metacognition, classroom management, quantity of instruction, classroom interactions, classroom climate, and the peer group.

Variables Important to Learning: A Meta-Review of Reviews of the Research Literature

Educational research has identified a large number of variables related to school learning. Indeed, such a multiplicity of distinct influences on achievement have been found that educators may be perplexed as to which items are most important. Educational researchers, policy makers, and practitioners all require clearer guidance concerning the relative importance of different learning influences and the particular variables most likely to maximize school learning. To address this need, a comprehensive review and synthesis of handbooks, review annuals, and other highly synthetic prior reviews was undertaken. Its purpose was to characterize the most authoritative scholarly opinion about ways to optimize educational outcomes across a range of educational conditions and settings. This research synthesis is distinguished by its comprehensiveness, its orientation toward practical school improvement strategies, and its focus on comparing the relative contributions of different items to learning. To organize the synthesis, a conceptual framework was developed which draws heavily upon major theoretical models of school learning. Before turning to this framework, the evolution of these earlier theoretical models is briefly described.

Evolution of Models of School Learning

J. B. Carroll (1963) introduced educational researchers to models of school learning in his Teachers College Record aptly entitled article, "A Model of School Learning." In his model, he put forth six constructs: aptitude, ability to comprehend instruction, perseverance, clarity of instruction, matching the task to student characteristics, and opportunity to learn. These constructs, which succinctly capture the psychological influences on school learning, became a point of departure for other models to follow. The 1960s and 1970s were marked by the introduction of several additional important models of learning, including those of Bruner (1966), Bloom (1976), Harnischfeger and Wiley (1976), Glaser (1976), and Bennett (1978).

All of these models recognize the primary importance of student ability, and included constructs such as aptitude, prior knowledge, verbal IQ, and pupil background. Most of them also address the importance of motivation, by employing such constructs as perseverance, self concept of the learner, and attitude toward school subject matter. This acknowledgement of individual difference variables among learners stood in contrast to more narrowly psychological studies of influences on learning, which generally treated individual differences as a source of error, focusing instead on instructional-treatment variables (Hilgard, 1964).

In addition to student variables, each of the models of school learning noted above also gave salience to constructs developed from studies of classroom instruction. These constructs varied in generality, some being as broad as "instructional events" or "clarity of instruction," and others as narrow as "use of cues" or "feedback and correctives."

Although later models brought some refinement in the ways in which individual difference variables and instructional variables were defined and the ways in which they were related to one another, the primary contributions of more recent models have been in extending the range of influences considered. Haertel, Walberg, and Weinstein (1983), for example, identified nine theoretical constructs that exhibit consistent causal influences on academic learning: student age or developmental level, ability (including prior achievement), motivation, amount or quantity of instruction, quality of instruction, psychological environment of the classroom, influence of the home, influence of the peer group outside of school, and exposure to mass media. They showed that previous models of school learning neglected extramural and social-psychological influences.

The evolution of models of school learning was further advanced with the introduction of models of adaptive instruction (Wang & Lindvall, 1984; Wang & Walberg, 1985). School-based implementation of models of adaptive instruction are designed to help schools create learning environments that maximize each student's opportunities for success in school. It paid particular attention to new variables associated with instructional delivery systems, program design, and implementation. It attended in particular to those features that Glaser (1982) referred to as the "large practical variables," and included efficient allocation and use of teacher and student time, a practical classroom management system, systematic teacher feedback and reinforcement of student learning behavior and progress, instructional interactions based on the diagnosed learning needs of individual students, and flexible administrative and organizational patterns responsive to program implementation and staffing needs.

Another contribution to models of school learning came from sociologists concerned with the identification of effective schools. Ronald Edmonds (1979) is most strongly associated with this identification of variables associated with exceptionally effective schools, especially for the urban poor. Significant contributions to effective schools models were also made by Brookover (1979), Brookover and Lezotte (1979), and Rutter, Maughan, Mortimore, Ouston, and Smith (1979). Illustrations of the types of variables characterizing effective schools include degree of curriculum articulation and organization, schoolwide staff development, parental involvement and support, schoolwide recognition of academic success, maximized learning time, district support, clear goals and high expectations, orderly and disciplined school environment, and leadership of principal characterized by attention to quality of instruction (Purkey & Smith, 1983).

These various models of school learning all contribute a variety of items, or variables, that may be useful to educational practitioners. Individual researchers may focus their work on particular variables or constructs, but the purpose of this synthesis was to try to provide a synoptic view of the entire panoply of variables.

Methods and Procedures

The first step in developing the meta-review described in this paper was to delineate a comprehensive set of variables organized into an inclusive conceptual framework. Next, a corpus of over 150 books, book chapters, new variables associated with instructional delivery systems, program design, and implementation. It attended in particular to those features that Glaser (1982) referred to as the "large practical variables," and included efficient allocation and use of teacher and student time, a practical classroom management system, systematic teacher feedback and reinforcement of student learning behavior and progress, instructional interactions based on the diagnosed learning needs of individual students, and flexible administrative and organizational patterns responsive to program implementation and staffing needs.

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Methods and Procedures

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The detailed ratings were then recoded onto a set of summary forms, one for each chapter or other source, which gave overall ratings of strength of influence for each of the items discussed in that source. These summary ratings were entered into machine-readable files and analyzed to determine the emergent consensus on which items exert the most powerful influence on learning outcomes. The initial coding tabulated well over 10,000 separate statements in the research literature concerning of the strength of association between one of the 228 items and learning outcomes. These were reduced to over 3,700 summary ratings, which were then keyed and analyzed.[3]

Before describing the data analyses and the findings of this study, the development of the conceptual framework, selection of the corpus of studies, and coding procedures are briefly described.

Conceptual framework for items related to learning

The identification of a comprehensive set of items began with a close examination of the models of school learning described above, as well as selected sources, including Brophy (1986), Keogh, Major-Kingsley, Omori-Gordon, and Reid (1982), Wang and Walberg (1985), and Wittrock (1986). Potential variables were written on separate index cards, then consolidated and organized into a preliminary version of the final coding scheme. This draft coding scheme was sent to members of the Scientific Advisory Panel of the Center for Research in Human Development and Education at Temple University[4]. Based on detailed commentaries received from the Panel members, the framework was revised to include four additional items, and to improve its organization.

The final framework organized the 228 items related to learning into 30 a priori scales within six broad categories. The six categories were ordered roughly from more distal to more proximal factors. Brief descriptions of the categories are presented in Table 1, together with illustrative items from each scale.

Selection of a corpus of studies

A vast research literature addresses one or more of the potential learning influences represented by the conceptual framework, and it clearly would not be possible to examine all of the thousands of original studies relevant to a synthesis of this scope. Indeed, even the literature of review articles is massive. For this reason we focused on authoritative reviews and handbook chapters, especially those sponsored by the American Educational Research Association and other organizations, and selected additional syntheses in government documents and other sources. A preliminary list of sources was reviewed by the Scientific Advisory Panel, and revised following their recommendations. Following this review, the sources chosen included chapters from the past decade or more of the Review of Research in Education, the Annual Review of Psychology, and the Annual Review of Sociology, as well as the Handbook of Research on Teaching (Wittrock, 1986), Designs for Compensatory Education (Williams, Richmond, & Mason, 1986), more specialized handbooks, and a small number of journal articles chosen to assure coverage of all of the areas addressed in the comprehensive framework. Initially, over 200 articles, chapters, and other sources were identified. All of these sources were read, but some were excluded from the final corpus because they failed to address K-12 instruction in regular school settings, because they addressed exceptionally narrow and atypical learning outcomes, or because they were relevant only to rare or special-learner populations.

A total of 179 sources were included in the final corpus of studies (see Appendix for a complete bibliography). All of these were relevant to a range of cognitive and or affective learning outcomes for K-12 learners in formal educational settings. Table 2 presents a summary by type of the source documents included in the final synthesis.

Coding procedures

Each source document was coded initially onto a detailed rating form, which allowed for the recording of multiple references in a single document to the same item. In addition to coding references to the 228 prespecified items, space was provided for the coding of any additional items related to learning outcomes, referred to on the form as supplementary items. Brief notes were also recorded for most sources, including page references, comments on the source's overall relevance, and any limitations on the learner populations and/or varieties of learning outcomes addressed. This archived documentation has been retained by the first author.

Each reference to an item's relation to learning outcomes was coded on a three-point scale, with "1" representing a weak, uncertain, or inconsistent relation to learning; "2" representing a moderate relation; and "3" representing a strong relation. Where "vote counts" or proportions of confirming studies were reported, a "3" indicated that more than 80 percent of the studies discussed had found a statistically significant association of an item to achievement; a "2" indicated that between 40 percent and 80 percent of the studies found support for the relationship; and a "1" indicated less than 40 percent in support. Where results were summarized in terms of effect sizes, a code of "3" was assigned to effect sizes greater than .33, "2" to effect sizes of .10 to .33, and "1" for smaller effect sizes. Where correlations were reported, "3" was used for correlations greater than .40, "2" for correlations of .15 to .40, and "1" otherwise.

In many cases, the source documents did not present quantitative indices like effect sizes or correlations, and so it was necessary to judge the strength of the evidence presented from prose descriptions of the conclusions from bodies of research. In these cases, the strength of the evidence presented was judged weak, moderate, or strong, and coded accordingly. Even though all of the 228 items were defined in such a way that they were expected to relate positively to learning, there were rare instances in which negative conclusions from the literature were reported.[5]

Following the coding of all specific references by page number, ratings were transcribed onto a second, summary form for each source, prior to keying for data analysis. At this stage, a single, summary code -- the average of all the ratings for each source document -- was recorded indicating the strength of association for each item discussed in the source, according to the preponderance of the specific references noted.[6]

Data Analysis

After inspecting univariate frequency distributions for each of the 228 separate items to assure that no values were out of range, the separate items were aggregated to the level of the thirty scales described in Table 1. This was accomplished by taking the average of all non-missing values in a scale, for each source. In cases where a source document did not discuss any of the separate items in a scale, a missing data code was entered. In those rare cases where negative findings were coded, their negative signs were retained when averages were taken.

In a second stage of data reduction, six additional variables were created, corresponding to the categories described in Table 1. The values of these variables for each source were weighted averages of all nonmissing scale values comprised by that category.[7] Means, standard deviations, and alpha reliabilities for the six categories and thirty scales are presented in Table 3. The reliabilities for documents (not raters) range from .71 to .99. All but four are greater than .80, and most exceed .90[8].

Table 3 also reports the number of sources that discussed items in each scale. Surprisingly, the frequency with which different scale items are discussed in the literature is not a reliable guide to their importance for learning outcomes. The Spearman rank correlation between frequencies and means across the 30 scales is only .10.

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Table 3 also reports the number of sources that discussed items in each scale. Surprisingly, the frequency with which different scale items are discussed in the literature is not a reliable guide to their importance for learning outcomes. The Spearman rank correlation between frequencies and means across the 30 scales is only .10.

Summary of Results

Table 3 shows the importance of many distinct influences on school learning outcomes. Over all 30 scales, the mean rating was roughly 1.8, a little below the level designated "moderate relation to learning." More important, however, the synthesis shows which categories, scales, and specific items are most strongly associated with learning outcomes. In discussing results by category and by scale, relevant findings concerning specific items will be presented to clarify or elaborate the category- and scale-level findings reported in Table 3.

At the highest level of generality, this synthesis confirms the importance of the quality of schooling for learning outcomes. Of the six categories, the highest ratings overall were assigned to "Program Design Variables," followed by "Out of School Contextual Variables." The category reflecting the quality of instruction as delivered, "Classroom Instruction and Climate Variables," ranked third in importance, closely followed by "Student Variables." The last two categories, "School-Level Variables" and "State and District Variables," received markedly lower ratings overall. This overall ranking of sources of influence contrasts sharply with the "conventional wisdom" since the time of the Equality of Educational Opportunity (EEO) Survey (Coleman, et al., 1966) that quality of schooling has relatively little impact on schooling outcomes relative to out-of-school, socioeconomic variables.

The importance of proximal psychological variables may be seen in the scales that obtained the highest ratings.[9] Those scales with mean ratings of 2.00 or greater were (beginning with the highest):

o	Metacognition	X = 2.08
o	Classroom Management	X = 2.07
o	Quantity of Instruction	X = 2.02
o	Student/Teacher Interactions: Social	X = 2.02
o	Classroom Climate	X = 2.01
o	Peer Group Influences	X = 2.00

In the remainder of this section, the categories and scales are discussed in turn, and those scales and items that received exceptionally high ratings are highlighted. The categories representing instruction as designed and instruction as delivered are discussed first. These are followed by out-of-school context and student characteristics. Finally, the more distal variable categories of school level variables and state and district variables are addressed.

Program Design Variables

This category includes instruction as designed, and the physical arrangements for its delivery, organized into three scales, as shown in Tables 1 and 3. The scale "Demographic and Marker Variables" was rated highest of the three, and within this scale the most highly rated items are "size of instructional group (whole class, small group, or one-on-one instruction)," "number of classroom aides," and "resources needed." (Ratings for these items ranged from 1.95 to 2.00.) Thus, the most important aspect of program design appears to be the intensity of educational services provided to each learner. More aides, smaller groups, or increased material resources are associated with significantly higher learning outcomes.

"Curriculum and Instructional Variables" includes a number of items with average ratings above 2.0 (moderate relation to learning). The highest rated of these suggest that the key to effective instructional design is the flexible and appropriate use of a variety of instructional strategies, while maintaining an orderly classroom environment. The highest overall rating in this scale was for "Use of ... techniques to control classroom disruptiveness." This item was followed by "use of prescriptive instruction combined with aspects of informal or open education" and "presence of information in the curriculum on individual differences and commonalities," both of which explicitly relate to student diversity and individualization. Other highly rated items referred to specific instructional strategies, including "use of mastery learning techniques, ... instructional cues, engagement, and corrective feedback, " "use of cooperative learning strategies," and "use of diagnostic-prescriptive methods."

"Curriculum Design" also includes several items with average ratings near 2.0, although none exceeds the "moderate" level. High ratings were given to "materials employ alternative modes of representation" and "degree of structure instruction as delivered are discussed first. These are followed by out-of-school context and student characteristics. Finally, the more distal variable categories of school level variables and state and district variables are addressed.

Program Design Variables

This category includes instruction as designed, and the physical arrangements for its delivery, organized into three scales, as shown in Tables 1 and 3. The scale "Demographic and Marker Variables" was rated highest of the three, and within this scale the most highly rated items are "size of instructional group (whole class, small group, or one-on-one instruction)," "number of classroom aides," and "resources needed." (Ratings for these items ranged from 1.95 to 2.00.) Thus, the most important aspect of program design appears to be the intensity of educational services provided to each learner. More aides, smaller groups, or increased material resources are associated with significantly higher learning outcomes.

"Curriculum and Instructional Variables" includes a number of items with average ratings above 2.0 (moderate relation to learning). The highest rated of these suggest that the key to effective instructional design is the flexible and appropriate use of a variety of instructional strategies, while maintaining an orderly classroom environment. The highest overall rating in this scale was for "Use of ... techniques to control classroom disruptiveness." This item was followed by "use of prescriptive instruction combined with aspects of informal or open education" and "presence of information in the curriculum on individual differences and commonalities," both of which explicitly relate to student diversity and individualization. Other highly rated items referred to specific instructional strategies, including "use of mastery learning techniques, ... instructional cues, engagement, and corrective feedback, " "use of cooperative learning strategies," and "use of diagnostic-prescriptive methods."

"Curriculum Design" also includes several items with average ratings near 2.0, although none exceeds the "moderate" level. High ratings were given to "materials employ alternative modes of representation" and "degree of structure in curriculum accommodates needs of different learners," both of which reinforce the importance of offering a variety of instructional materials and approaches to accommodate individual differences. The importance of the organization of curriculum content is revealed by two highest-rated items in this scale, "materials employ learning hierarchies" and "material is presented in a cognitively efficient manner."

Implementation, Classroom Instruction, and Climate Variables

This category includes support of the curriculum and the instructional program; classroom routines; specific instructional, assessment, and classroom management practices; quantity of instruction; academic and nonacademic student-teacher interaction; and classroom climate. It is by far the largest of the six categories, comprising 79 of the 228 items and eight of the thirty scales. Half of these scales had mean ratings above 2.00, placing them among the most influential scales overall.

High ratings in the areas of implementation, classroom instruction, and climate again point up the importance of maintaining an orderly classroom environment and providing clear, well organized instruction appropriate to the needs of individual learners. In the overall ranking of all 30 scales, "Classroom Management" ranked second. Its most critical items were "group alerting (teacher uses questioning/recitation strategies that maintain active participation by all students)" and "learner accountability (teacher maintains student awareness of learning goals and expectations)." Smooth transitions from one instructional activity to another, minimal disruptions, and teacher awareness of what is going on in the classroom at all times also received mean ratings above 2.00.

"Quantity of Instruction" was ranked third overall, following "Classroom Management." It includes time spent in direct instruction, especially direct instruction on basic skills; time spent on homework; and length of the school day and the school year. The importance accorded quantity of instruction is not surprising. This construct has appeared in many of the most widely cited models of school learning (Haertel, Weinstein, & Walberg, 1983).

"Student/Teacher Interactions: Social" ranked fourth overall, and "Classroom Climate" was ranked fifth. The high ranking for social interactions was almost entirely due to just two items with mean ratings of 2.00 or greater: "teacher reacts appropriately to correct and incorrect answers," and "student responds positively to questions from other students and from teacher."[10] "Classroom climate" included fifteen items with ratings of 2.00 or greater. Taken together, the highly rated items in these two scales characterize a classroom in which teacher and students interact considerately and cooperatively, where students work with several classmates, share common interests and values, and pursue cooperative goals. Students are actively engaged in learning, and are involved in making some types of classroom decisions. At the same time, the class is well organized and well planned, with a clear academic focus. Objectives of learning activities are specific and explicit, and students feel continually and appropriately challenged, with the pacing of instruction appropriate for the majority.

The remaining scales under "Implementation, Classroom Instruction, and Climate Variables" have much lower overall ratings, but include more than twenty specific items with means of 2.00 or greater. The majority of these items refer to instructional organization, and to mechanisms for assuring that students understand that organization and the goals of instruction. For example, high ratings were given to use of advance organizers and directing students' attention to the content to be learned; and to clear and organized direct instruction, systematic sequencing of lesson events, and clear lesson transitions. Other highly rated items included corrective feedback in case of student error, frequent academic questions, and accurate measurement of skills. Finally, the literature strongly supports the teaching of skills in the context of meaningful application, use of good examples and analogies, and teaching for meaningful understanding, together with explicit promotion of student self-monitoring of comprehension and gradual transfer of responsibility for learning from the teacher to the student.

Extramural Variables

This category includes items associated with the home and community contexts within which schools function. As presented above, "Peer Group Variables" was ranked sixth among all scales. This was due primarily to the emphasis placed on peers' educational and occupational aspirations, both of which had mean ratings of 2.00 or higher.

Additional highly rated items in this category reflected parental interest and involvement in students' school work. For example, "parental involvement in assuring completion of homework," "parental participation in school conferences and related activities," and "parental interest in students' school work" all received high ratings. The educational environment of the home (e.g., number of books and magazines) was also cited in numerous sources, and received consistently high ratings. Student participation in clubs and extracurricular school activities and time spent on leisure reading were also moderately related to learning outcomes.

Student Variables

These are items associated with individual students themselves, including demographics, academic history, and various social, cognitive, and affective characteristics. Among these items, the one with the highest rating was "psychomotor skills specific to area instructed," with a rating of 2.33. This was the only item included in the "Psychomotor Variables" scale. However, as explained above, this mean is based on only six sources. It is best regarded as a statistical artifact, and will not be further discussed.

"Metacognitive Variables" received the highest mean ratings of any of the remaining scales in the entire framework. Highly rated metacognitive items include "comprehension monitoring (planning; monitoring effectiveness of attempted actions; testing, revising, and evaluating learning strategies)," "self-regulatory, self-control strategies (e.g., control of attention)," and "positive strategies to facilitate generalization of concepts."

A number of specific items in the remaining "Student Variables" scales also had high ratings, including positive behavior and ability to make friends with peers, motivation for continual learning, and perseverance on learning tasks. Highly rated items from the "Cognitive" scale included several representing general mental abilities, levels of basic skills sufficient to profit from instruction, and prior knowledge in the subject area instructed.

School Level Variables, and State and District Variables

Educational policy items at the school, district, and state levels appear from this research synthesis to have relatively little association with learning outcomes, as shown by low mean ratings for categories and scales. A few items in this area received mean ratings of 2.00 or higher, but nearly all of these were based on fewer than ten sources. Nonetheless, several school-level educational practices emerged as important. These included the presence of an "effective schools" program; explicit school grading, academic progress, and attendance policies; and a safe and orderly school climate. Peer and cross-age tutoring, which were classified as school-level variables when their implementation required coordination among self-contained classrooms, also received moderate or higher ratings based on discussions in more than ten sources.

Discussion

This research synthesis confirms that distal policy variables are less important to schooling outcomes than quantity and quality of instruction, home environment, or student characteristics. Of the six categories in the conceptual framework (See Tables 1 and 3), "State and District Variables" and "School Level Variables," both comprising mainly policy variables, had markedly lower mean ratings than the remaining four categories. The items most important to learning outcomes are those that are directly tied to students' engagement with the material to be learned.

In contrast to the earlier view that quality of schooling is of little importance relative to out-of-school factors (e.g., Coleman, et al., 1966), this synthesis also suggests that from kindergarten through the twelfth grade, across a range of content areas and educational contexts, quality and quantity of instruction are roughly equal in importance to student characteristics and out-of-school contextual items.

Furthermore, the present synthesis of educational research is considerably more comprehensive than What Works: Research About Teaching and Learning, the widely-distributed pamphlet of the U.S. Department of Education (1986); it contains both highly effective and relatively less effective practices. The present synthesis, moreover, draws on a larger body of literature, and contains a more explicit methodology that can be replicated by other investigators. It contains some 228 practices in comparison with 41 in the original What Works (and 62 in the second edition); and it gives a numerical rating to each one as well as composites. Yet none of the findings of What Works and the present work are discordant. What Works contains specific findings and elaborates on and illustrates various techniques. Such techniques are described specifically enough to be understood by parents and teachers; perhaps they might even be put into practice without assistance.

To be useful to practitioners, the present findings, many of which are abstract and concern more complex practices, would have to be further described and exemplified. To accomplish this, reviewers would have to return to the review literature and perhaps the original studies to analyze the specific operational definitions of techniques. These would require translation into plain language and prescriptive practices. Many are sufficiently complex that they could not be implemented without training and staff development. Such an effort would be considerable but worthwhile.

Turning from the level of the six broad categories to the thirty scales, those identified as most important to good learning outcomes are student metacognition, effective classroom management, quantity of instruction, positive and productive student/teacher Interactions, a classroom climate conducive to learning, and a peer culture supportive of academic achievement. These broad conclusions are supported by a number of more specific findings from the research synthesis. These selected findings are highlighted below.

Student characteristics

Individual differences among students have long been recognized as critical determinants of learning outcomes, but it was both surprising and encouraging that in this synthesis the metacognitive items emerged as most important, including comprehension monitoring, use of self-regulatory, self-control strategies, and use of strategies to facilitate generalization of concepts. Metacognitive variables are heavily cited in the current literature, in contrast to an earlier focus on relatively stable general mental abilities. A better understanding of these alterable variables may ultimately help the great majority of students to reach higher achievement levels through appropriate training in metacognition. Two additional student items accorded importance in the research literature were "perseverance on learning tasks" and "motivation for continual learning." Both of these reinforce the conclusion that consistent engagement with the subject matter to be learned is critical to school success.

Quality and quantity of instruction

Classroom management and climate and student-teacher interactions represent an important constellation of variables related to effective instruction. Detailed examination of the highly rated items in these areas reveals a portrait of cooperative, cohesive, goal-directed classrooms in which a variety of educational approaches and activities are employed. Items heavily cited in the research literature include sound organization and systematic sequencing of instruction, and effective use of direct, teacher-centered instruction. Among other instructional approaches frequently linked to positive learning outcomes were peer and cross-age tutoring and cooperative group learning strategies.

Several items associated with quantity of instruction also emerged as important, including student time on task, length of school day and school year, amount of time allocated to direct instruction in basic skills, and time spent out of school on homework and on leisure reading. Of these, the most frequently cited variable is time on task. These time-related variables have clearly become well established and widely accepted as determinants of learning outcomes, in spite of criticisms cited by (Shulman, 1986) of time as an "empty vessel."

Out of school context

There has been increasing attention in the research literature to the role of parental involvement and support variables in promoting student learning. The synthesis affirmed the importance of these items, as well as peer group influences. These findings were reflected in ratings for parental involvement in school activities, interest in schoolwork, and monitoring of school attendance and homework completion. Parental support might also be mediated through influence on students' selection of friends. Peer group variables, especially academic and occupational aspirations, were found to be strongly related to school success.

Strength of influences on school learning

Physical processes can often be explained as functions of a small number of variables interacting in simple ways. In contrast, schooling processes respond to a multitude of influences interacting in kaleidoscopic patterns. This research synthesis has confirmed that a large number of variables are moderately related to learning outcomes, but few if any single variables are very strongly related to learning. Authors of original research studies and of reviews and syntheses are appropriately cautious in stating the importance of particular items, and their caution is reflected in the relatively narrow range of mean ratings shown in Table 3. Nonetheless, taken together, the items examined in this synthesis are powerful determinants of school effects.

The conclusions discussed in this section are based on what appears to be the most comprehensive analysis of the literature on effective educational practices for regular and special education. Related work involving the consensus of the panel of experts, the authors of research reviews, and regular and special practitioners adds further support to the conclusions (Wang, Walberg, & Reynolds, 1989; Reynolds, Wang, & Walberg, 1989).

Still, certain caveats should be noted: It cannot be determined from the analyses, for example, what actual effect sizes will result; the analyses merely estimate their relative sizes. In addition, the analyses yield neither actual nor relative estimates of combinations of practices. It would seem reasonable to suppose that implementation of more practices with the highest estimates would yield the largest effects, but this supposition is a matter for subsequent empirical research.

Another caveat applies to the content analysis of research literature on group-level effects, notably the literature on effective schools. Some of the effective schools factors have been analyzed in relation to school averages on achievement tests. Such relationships might be found somewhat larger or smaller if calculated for individual children. It can be expected that expert reviewers on this subject (on which the syntheses depend) would take this uncertainty into consideration in interpreting their findings. It has rarely been demonstrated that techniques that work for the average student have deleterious consequences for other students' learning.

Nonetheless, it is worth keeping this limitation in mind in interpreting the findings and in tracing their implications. There are many other cautions that ordinarily apply to educational research, such as the possibility that effective methods found a decade ago no longer apply today. These are obvious enough to leave to researchers and experienced educators as they think about how the findings apply in their own situations.

NOTES

1. This research was supported in part by the Temple University Center for Research in Human Development and Education, and in part by a grant from the U. S. Department of Education's Office of Special Education and Rehabilitative Services. The opinions expressed herein are solely those of the authors, and no official endorsement should be inferred.

2. Copies of the detailed coding form and complete bibliographic citations for the 179 sources, as well as copies of the data archive are available from Dr. Margaret C. Wang at the Center for Research in Human Development and Education, Ritter Hall Annex, 9th Floor, Temple University, Philadelphia, PA 19122.

3. In addition to the coding and analysis of the 179 source documents, a survey was also conducted of the authors of all major source documents examined. The summary coding form described below was distributed to authors, with a request to provide overall ratings of the importance of the 228 items to learning outcomes. A total of 78 forms were returned. These expert ratings were analyzed separately from the source document ratings, following identical procedures. Results were highly similar, with the exception that the experts generally tended to give somewhat higher numerical ratings.

4. This panel included 12 prominent experts in areas of research on teaching, education, educational psychology, and special education.

5. Most of these occurred for items in the scale, "History of Educational Placements," which accounts for the low mean of this variable in Table 3.

6. If any supplementary items had been coded, these were reexamined as the forms were transcribed, and whenever possible were included under one of the prespecified items. This was generally possible because most supplementary items documented authors' more detailed or specific empirical conclusions, for example, specific types of motivation related to learning, or particular variants

of instructional practices. Such detailed findings were incorporated into the broader variable prespecified on the form. The other major group of supplementary items were those documenting two-way or occasionally higher-order interactions. Because interactions represent more subtle findings and frequently fail to replicate, they were not transferred from the detailed form to the summary form. The summary forms were keyed and verified, and files were prepared for data analysis using standard statistical software packages.

7. The weights used were equal to the numbers of original items included in the respective scales. Note that if there were no missing data, this procedure would result in giving all of the original items in a broad category equal weight. Where some items in a scale are missing, this procedure in effect assigns the mean of the nonmissing scale items to those missing observations. For any given scale, about 15 percent of the values of items on average were missing.

8. As noted in the footnote to the table, these reported reliabilities are for means of all the items in a given category or scale. Due to missing data, values for some sources were based on means of fewer items.

9. The highest ratings overall were assigned to "Psychomotor Variables," and a moderately high rating was also assigned to the scale "Accessibility Variables." However, only one item was included in each of these scales, and these items were referred to in six or fewer of the 179 sources analyzed. Thus, "Psychomotor Variables" and "Accessibility Variables" were set aside. The list of scales with the highest ratings include the 28 scales with more items and more ratings.

10. A third item in this scale, "teacher provides explicit coaching to reduce aggression," also received a mean rating above 2.00, but was mentioned in only 4 of the 179 sources. This item is of limited relevance in most regular educational settings.

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Table 1

Conceptual Framework with Illustrative Examples

Category/Subcategory[a]	Illustrative Variable
Category I. State and District Variables: These are variables associated with state and district level school governance and administration. They include state curriculum and textbook policies, testing and graduation requirements, and teacher licensure; as well as specific provisions in teacher contracts, and some district-level administrative and fiscal variables.	
District Level Demographics and Marker Variables	School district size
State Level Policy Variables	Teacher licensure requirements
Category II. Out of School Contextual Variables: These are variables associated with the home and community contexts within which schools function. They include community demographics, peer culture, parental support and involvement, and amount of time students spend out-of-school on such activities as television viewing, leisure reading, and homework.	
Community Variables	Socioeconomic level of community
Peer Group Variables	Level of peers' academic aspirations
Home Environment and Parental Support Variables	Parental involvement in assuring completion of homework
Student Use of Out of School Time Variables	Student participation in clubs and extracurricular school activities
Category III. School Level Variables: These are variables associated with school-level demographics, culture, climate, policies, and practices. They include demographics of the student body, whether the school is public or private, and levels of funding for specific categorical programs; school-level decision making variables, and specific school-level policies and practices, including policies on parental involvement in the school.	
Demographic and Marker Variables	Size of school
Teacher/Administrator Decision Making Variables	Principal actively concerned with instructional program

Table 1 (Category III, continued)

Category/Subcategory	Illustrative Variable
School Culture Variables (Ethos Conducive to Teaching and Learning)	School-wide emphasis on and recognition of academic achievement
School-Wide Policy and Organizational Variables	Explicit school-wide discipline policy
Accessibility Variables	Accessibility of educational program (overcoming architectural, communication, and environmental barriers)
Parental Involvement Policy Variables	Parental involvement in improvement and operation of instructional programs

Category IV: Student Variables: These are variables associated with individual students themselves, including demographics, academic history, and a variety of social, behavioral, motivational, cognitive, and affective characteristics.

Demographic and Marker Variables	Gender
History of Educational Placement	Prior grade retentions
Social and Behavioral Variables	Positive, nondisruptive behavior
Motivational and Affective Variables	Attitude toward subject matter instructed
Cognitive Variables	Level of specific academic knowledge in subject area instructed
Metacognitive Variables	Comprehension monitoring (planning: monitoring effectiveness of attempted actions; monitoring outcomes of actions; testing, revising, and evaluating learning strategies)
Psychomotor Variables	Psychomotor skills specific to area instructed

Table 1 (continued)

Category/Subcategory	Illustrative Variable
Category V. Program Design Variables: These are variables associated with instruction as designed, and with the physical arrangements for its delivery. They include the instructional strategies specified by the curriculum, and characteristics of instructional materials.	
Demographic and Marker Variables	Size of instructional group (whole class, small group, one-on-one instruction)
Curriculum and Instructional Variables	Alignment among goals, contents, instruction, assignments, and evaluation
Curriculum Design Variables	Materials employ advance organizers
Category VI. Implementation, Classroom Instruction, and Climate Variables: These are variables associated with the implementation of the curriculum and the instructional program. They include classroom routines and practices, characteristics of instruction as delivered, classroom management, monitoring of student progress, and quality and quantity of instruction provided, as well as student-teacher interactions and classroom climate.	
Classroom Implementation Support Variables	Establishing efficient classroom routines and communicating rules and procedures
Classroom Instructional Variables	Use of clear and organized direct instruction
Quantity of Instruction Variables	Time on task (amount of time students are actively engaged in learning)
Classroom Assessment Variables	Use of assessment as a frequent, integral component of instruction
Classroom Management Variables	Group alerting (teacher uses questioning/recitation strategies that maintain active participation by all students)

Table 1 (Category VI, continued)

Category/Subcategory	Illustrative Variable
Student and Teacher Interactions: Social Variables	Student responds positively to questions from other students and from teacher
Student and Teacher Interactions: Academic Variables	Frequent calls for extended, substantive oral and written response (not one-word answers)
Classroom Climate Variables	Cohesiveness (members of class are friends sharing common interests and values and emphasizing cooperative goals)

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[a]Subcategories are listed below the description of each broad category, and are each illustrated with representative variables. For example, the first broad category includes two subcategories, "District Level Demographics and Marker Variables," and "State Level Policy Variables."

Table 2

Number and Percent of Source Documents by Type

Type of Source[a]	N	Percent	Total Pages
Chapters from Annual Review Series	86	48	3,179
Handbook Chapters	44	25	1,089
Government Documents and Commissioned Reports	20	11	772
Book Chapters	18	10	563
Review Articles in Journals	11	6	152
Total	179	100	5,755

[a] A complete bibliography is available from the first author

Table 3

Reliabilities, means, standard deviations, and frequencies for source ratings

Category/Subcategory	Reliability[a]	Mean	S.D.	Frequency
State and District Variables	.90	1.22	.81	27
District demographics & marker vars.	.95	1.46	.50	14
State level policy variables	N.C.	1.24	1.00	19
Out of School Contextual Variables	.99	1.87	.39	59
Community variables	N.C.	1.80	.41	15
Peer group variables	.98	2.00	.34	18
Home environment & parental support	.95	1.90	.40	47
Student use of out-of-school time	N.C.	1.94	.46	17
School Level Variables	.95	1.54	.96	102
Demographics and marker variables	.91	1.74	.56	25
Teacher/administrator decision making	.87	1.65	.95	21
School culture variables	.87	1.84	.43	49
School-wide policies and organization	.76	1.40	1.14	74
Accessibility variables	N.C.	2.00	.00	2
Parental involvement policy variables	N.C.	1.67	.56	23
Student Variables	.92	1.83	.57	155
Demographics and marker variables	.71	1.70	.77	90
History of educational placements	N.C.	0.16	1.80	19
Social and behavioral variables	.80	1.98	.34	35
Motivational and affective variables	.91	1.93	.42	81
Cognitive variables	.88	1.98	.33	101
Metacognitivie variables	.91	2.08	.36	76
Psychomotor variables	N.C.	2.33	.52	6
Program Design Variables	.90	1.90	.38	142
Demographic and marker variables	N.C.	1.97	.54	23
Curriculum and instruction variables	.90	1.92	.46	108
Curriculum design variables	.89	1.88	.34	97
Classroom Instruction and Climate Variables	.97	1.84	.66	165
Classroom implementation support	.85	1.84	.38	66
Classroom instructional variables	.89	1.85	.74	156
Quantity of instruction variables	.94	2.02	.64	69
Classroom assessment variables	N.C.	1.89	.30	61
Classroom management variables	.98	2.07	.23	42
Student/teacher interactions: Social	.73	2.02	.41	44
Student/teacher interactions: Academic	.77	1.89	.44	29
Classroom climate variables	.99	2.01	.38	75

[a] Coefficient alpha reliabilities were estimated for each scale from average variances and inter-item covariances. Due to missing data, ratings for some cases are based on fewer items. Thus, obtained reliabilities are somewhat lower than the figures reported in this table. "N.C." indicates values that were not calculable, either because scales consisted of only a single item, or due to patterns of missing data.

APPENDIX

Bibliographic References for the 179 Sources Synthesized in

What Influences Learning? A Content Analysis of Review Literature

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Bibliographic References for the 179 Sources Synthesized in

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DELIVERABLE 3-B

Variables Important to Learning:
A Consensus from the Field

DELIVERABLE 3-B

Variables Important to Learning:
A Consensus From the Field

Developed by
Temple University Center for Research
in Human Development and Education

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Variables Important to Learning: A Consensus From the Field

This pamphlet provides a lists of all variables which emerged from a "meta-review" of professional literature concerned with variables that are important to school learning, as well as a summary of consensus ratings from the field.

The variables are organized under six major categories, as follows: a) State and District Variables, b) Out of School Contextual Variables, c) School Level Variables, d) Student Variables, e) Program Design Variables, and f) Implementation, Classroom Instruction, and Climate Variables. These variables constitute the items included in a questionnaire which was sent to six professional groups (i.e., researchers, policy makers, special and regular education teachers, school psychologists, and principals). In total, 1,123 persons responded to the questionnare. The respondents were asked to rate each of the variable items according to a 3-point scale.

Variables rated by the entire group as being of high importance (rating of 2.6 and above), and of moderate importance (rating of 2.0 - 2.5) in arranging learning environments are indicated under the column "Number of Effective Practices."

Variables Important To Learning: A Consensus From the Field

Variables	Number of Variables in Each Variable Category	Number of Effective Practices (rated as important) in Each Variable Category
CATEGORY I: State and District Variables		
A. District Level Demographics and Marker Variables	(10)	3
B. State Level Policy Variables	(6)	3
CATEGORY II: Out of School Contextual Variables		
A. Community Variables	(3)	3
B. Peer Group Variables	(5)	5
C. Home Environment and Parental Support Variables	(9)	9
D. Student Use of Out of School Time Variables	(5)	3
CATEGORY III: School Level Variables		
A. Demographic and Marker Variables	(8)	3
B. Teacher/Administrator Decision Making Variables	(6)	6
C. School Culture Variables (Ethos Conducive to	(8)	8
Teaching and Learning)	(13)	
D. School-Wide Policy and Organizational Variables	(1)	11
E. Accessibility Variables	(2)	1
F. Parental Involvement Policy Variables		2
CATEGORY IV: Student Variables		
A. Demographic and Marker Variables	(7)	4
B. History of Educational Placements	(3)	3
C. Social and Behavioral Variables	(5)	5
D. Motivational and Affective Variables	(9)	9
E. Cognitive Variables	(12)	12
F. Metacognitive Variables	(4)	4
G. Psychomotor Variables	(1)	1
CATEGORY V: Program Design Variables		
A. Demographic and Marker Variables	(4)	4
B. Curriculum and Instructional Variables	(15)	15
C. Curriculum Design Variables	(13)	13
CATEGORY VI: Implementation, Classroom Instruction and Climate Variables		
A. Classroom Implementation Support Variables	(6)	4
B. Classroom Instructional Variables	(26)	26
C. Quantity of Instruction Variables	(12)	11
D. Classroom Assessment Variables	(4)	4
E. Classroom Management Variables	(5)	5
F. Student and Teacher Interactions: Social Variables	(6)	6
G. Student and Teacher Interactions: Academic Variables	(5)	5
H. Classroom Climate Variables	(15)	15

Variables	Consensus Rating
Category I. State and District Variables:	
These are variables associated with state and district level school governance and administration. They include state curriculum and textbook policies, testing and graduation requirements, and teacher licensure; as well as specific provisions in teacher contracts, and some district-level administrative and fiscal variables.	
I-A. District Level Demographics and Marker Variables	
1. School district size	
2. Degree of school district bureaucratization	
3. Degree of school district centralization	
4. Presence of contractual limits on after-school meetings	
5. Limits on class size	
6. Presence of contractual restrictions on activities performed by aides	
7. Degree of central office assistance and support for programs	*
8. Degree of board of education support for instructional programs	*
9. Per pupil expenditure	*
Efficiency of transportation system	
I-B. State Level Policy Variables	
1. Teacher licensure requirements	*
2. Degree of state control over textbooks	
3. Degree of state control over curriculum	
4. Academic course and unit requirements	*
5. Minimum competency test requirements	
6. Adherence to least restrictive environment/mainstreaming	*

Note: ** = highly important (mean rating of 2.6 and above, based on a 3-point scale)
* = moderately important (mean rating of 2.0 - 2.5, based on a 3-point scale)

Variables	Consensus Rating
Category II. Out of School Contextual Variables:	
These are variables associated with the home and community contexts within which schools function. They include community demographics, peer culture, parental support and involvement, and amount of time students spend out-of-school on such activities as television viewing, leisure reading, and homework.	
II-A. Community Variables	
1. Socioeconomic level of community	**
2. Ethnic mix of community	*
3. Quality of social services for students	*
II-B. Peer Group Variables	
1. Level of peers' academic aspirations	**
2. Level of peers' occupational aspirations	**
3. Presence of well defined clique structure	*
4. Degree of peers' substance abuse	**
5. Degree of peers' criminal activity	**
II-C. Home Environment and Parental Support Variables	
1. Educational environment (e.g., number of books and magazines at home)	**
2. Parental involvement in assuring completion of homework	**
3. Parental involvement in assuring regular school attendance	**
4. Parental monitoring of student television viewing	**
5. Parental participation in school conferences and related activities	*
6. Parental application of appropriate, consistent discipline	**
7. Parental expression of attention to children	**
8. Parental interest in student's school work	**
9. Parental expectation for academic success	**
II-D. Student Use of Out of School Time Variables	
1. Student participation in clubs and extracurricular school activities	
2. Amount of time spent on homework	*
3. Amount of time spent on leisure reading	*
4. Amount of time spent viewing educational television	
5. Amount of time spent viewing noneducational television	*

Variables	Consensus Rating
Category III. School Level Variables:	
These are variables associated with school-level demographics, culture, climate, policies, and practices. They include demographics of the student body, whether the school is public or private, levels of funding for specific categorical programs, school-level decision making variables, and specific school-level policies and practices, including policies on parental involvement in the school.	
III-A. Demographic and Marker Variables	
1. Public versus private school	
2. Size of school	
3. Level of Chapter I (compensatory education) funding	*
4. Level of Title VII (bilingual) funding	
5. Level of PL 94-142 (handicapped) funding	*
6. Mix of socioeconomic levels in the school	*
7. Mix of cultural/ethnic groups in the school	
8. Mix of student language backgrounds in the school	
III-B. Teacher/Administrator Decision Making Variables	
1. Teacher and administrator consensus on school values, norms, and roles	**
2. Principal actively concerned with instructional program	**
3. Teacher involvement in curricular decision making	**
4. Teacher involvement in instructional decision making	**
5. Teacher involvement in resource allocation decisions	*
6. Teacher involvement in finding ways to increase academic performance	**
III-C. School Culture Variables (Ethos Conducive to Teaching and Learning)	
1. Use of cooperative, not exclusively competitive, goal structures	*
2. School-wide emphasis on and recognition of academic achievement	**
3. Low staff absenteeism	*
4. Low staff turnover	*
5. Low staff alienation	**
6. Active collaboration between regular classroom teachers and special education teachers	**
7. Safe, orderly school climate	**
8. Degree of school personnel professional collaboration	**

Variables	Consensus Rating
Category III. School Level Variables: (continued)	
III-D. School-Wide Policy and Organizational Variables	
1. Presence of "effective schools program"	*
2. Explicit school grading and academic progress policies	*
3. Explicit school-wide discipline policy	*
4. Explicit school-wide attendance policy	*
5. Coordination of pullout programs for handicapped students with regular instructional programs	*
6. Use of multi-age grouping	
7. Use of instructional teaming	*
8. Use of cross-age tutoring	*
9. Use of peer tutoring	*
10. Use of academic tracking for specific school subject areas	*
11. Minimization of external classroom disruptions (e.g., broadcast announcements)	
12. Adherence to least restrictive environment/mainstreaming	*
13. Minimum use of suspension and expulsion as discipline tools	*
III-E. Accessibility Variables	
1. Accessibility of educational program (overcoming architectural, communication, and environmental barriers	*
III-F. Parental Involvement Policy Variables	
1. Parental involvement in improvement and operation of instructional programs	*
2. School-sponsored parenting skills workshops (e.g., behavior modification, parent effectiveness training)	*

Variables	Consensus Rating
Category IV. Student Variables:	
These are variables associated with individual students themselves, including demographics, academic history, and a variety of social, behavioral, motivational, cognitive, and affective characteristics.	
IV-A. Demographic and Marker Variables	
1. Chronological age	
2. Socioeconomic status	*
3. Gender	
4. Ethnicity	
5. First or native language	*
6. Physical and health status	*
7. Special education classifications (e.g., EMR, LD)	*
IV-B. History of Educational Placements	
1. Prior grade retentions	*
2. Prior special placements	*
3. Current placement in regular class versus self-contained special education class	*
IV-C. Social and Behavorial Variables	
1. Positive, nondisruptive behavior	**
2. Appropriate activity level	**
3. Cooperativeness with teacher	**
4. Cooperativeness with peers	**
5. Ability to make friends with peers	*
IV-D. Motivational and Affective Variables	
1. Attitude toward school	**
2. Attitude toward teachers	**
3. Attitude toward subject matter instructed	**
4. Motivation for continual learning	**
5. Independence as a learner	**
6. Perseverance on learning tasks	**
7. Self-confidence	**
8. Academic self-competence concept in subject area instructed	**
9. Attributions for success and failure in subject area instructed	**

Variables	Consensus Rating
Category IV. Student Variables: (continued)	
IV-E. Cognitive Variables	
1. Piagetian stage of cognitive development	*
2. Level of reasoning (fluid ability)	**
3. Level of spatial ability	*
4. Memory	**
5. Level of general academic (crystallized) knowledge	**
6. Level of specific academic knowledge in subject area instructed	*
7. Level of reading comprehension ability	**
8. Level of writing ability	*
9. Level of computational ability	*
10. Level of oral fluency	*
11. Level of listening skills	**
12. Learning styles (e.g., field independent, visual/auditory learners, high cognitive complexity)	*
IV-F. Metacognitive Variables	
1. Self-regulatory, self-control strategies (e.g., control of attention)	**
2. Comprehension monitoring (planning: monitoring effectiveness of attempted actions; monitoring outcomes of actions; testing, revising, and evaluating learning strategies)	**
3. Positive strategies for coping with failure	**
4. Positive strategies to facilitate generalization of concepts	**
IV-G. Psychomotor Variables	
1. Psychomotor skills specific to area instructed	*

Variables	Consensus Rating
Category V. Program Design Variables:	
These are variables associated with instruction as designed, and with the physical arrangements for its delivery. They include the instructional strategies specified by the curriculum, and characteristics of instructional materials.	
V-A. Demographic and Marker Variables	
1. Size of instructional group (whole class, small group, one-on-one instruction)	**
2. Proportion of students with special needs served in regular classes	*
3. Number of classroom aides required	*
4. Resources needed	*
V-B. Curriculum and Instructional Variables	
1. Clearly presented academic, social, and attitudinal program goals/outcomes	**
2. Use of explicit goal/objective setting for instruction of individual student (e.g., Individualized Educational Plans (IEPs)	*
3. Use of mastery learning techniques, including use of instructional cues, engagement, and corrective feedback	**
4. Use of cooperative learning strategies	*
5. Use of personalized instructional program	*
6. Use of prescriptive instruction combined with aspects of informal or open education	*
7. Use of diagnostic-prescriptive methods	*
8. Use of computer-assisted instruction	*
9. Use of crisis management techniques to control classroom disruptiveness	*
10. Use of program strategies for favorable affective climate	*
11. Alignment among goals, contents, instruction, assignments and evaluation	**
12. Curriculum units integrated around key discipline-based concepts	*
13. Use of multidisciplinary approaches to instructional planning (including diagnosis in educational planning)	*
14. Presence of information in the curriculum on individual differences and commonalities (including handicapping conditions)	*
15. Presence of culturally diverse materials in the curriculum	*

Variables	Consensus Rating
Category V. Program Design Variables: (continued)	
V-C. Curriculum Design Variables	
1. Materials employ alternative modes of representation	*
2. Material is presented in a cognitively efficient manner	**
3. Materials employ explicit and specific objectives	**
4. Materials employ advance organizers	*
5. Materials employ learning hierarchies	*
6. Materials are tied to assessment and diagnostic tests	*
7. Availability of materials and activities prepared specifically for use with whole classroom, small groups, or one-on-one instruction	*
8. Degree of structure in curriculum accommodates needs of different learners	**
9. Student interests guide selection of a significant portion of content	*
10. Availability of materials and activities for students with different abilities	**
11. Availability of materials and activities for students with different learning styles	**
12. Developmental issues considered	*
13. Student experiences considered	*

Variables	Consensus Rating
Category VI. Implementation, Classroom Instruction, and Climate Variables:	
These are variables associated with the implementation of the curriculum and the instructional program. They include classroom routines and practices, characteristics of instruction as delivered, classroom management, monitoring of student progress, and quality and quantity of instruction provided, as well as student-teacher interactions and classroom climate.	
VI-A Classroom Implementation Support Variables	
1. Creation and maintenance of necessary instructional materials	*
2. Adequacy in the configuration of classroom space	*
3. Availability of classroom aides	*
4. Use of written records to monitor student progress	
5. Establishing efficient classroom routines and communicating rules and procedures	
6. Developing student self-responsibility for independent study and planning of one's own learning activities	**
VI-B Classroom Instructional Variables	
1. Prescribing individualized instruction based on perceived match of type of learning tasks to student characteristics (e.g., ability, learning style)	*
2. Use of procedures requiring rehearsal and elaboration of new concepts	*
3. Use of clear and organized direct instruction	**
4. Systematic sequencing of instructional events and activities	**
5. Explicit reliance on individualized educational plans (IEPs) in planning day-to-day instruction for individual students	*
6. Use of instruction to surface and confront student misconceptions	*
7. Use of advance organizers, overviews, and reviews of obejctives to structure information	*
8. Clear signaling of transitions as the lesson progresses	*
9. Significant redundancy in presentation of content	*
10. Teacher conveys enthusiasm about the content	**
11. Directing students' attention to the content	**
12. Using reinforcement contingencies	**
13. Setting and maintaining clear expectations of content mastery	**
14. Providing frequent feedback to students about their performance	**
15. Explicitly promoting effective metacognitive learning strategies	*
16. Promoting learning through student collaboration (e.g., peer tutoring, group work)	*
17. Corrective feedback in event of student error	**
18. Flexible grouping that enables students to work to improve and change status/groups	**
19. Teaching for meaningful understanding	**
20. Degree to which student inquiry is fostered	**
21. Scaffolding and gradual transfer of responsibility from teacher to student	*
22. Degree to which assessment is linked with instruction	*
23. Skills taught within the context of meaningful application	**
24. Good examples and analogies to concretize the abstract and familiarize the storage	**
25. Consideration of the teacher's use of language in the instructional process	**
26. Explicitly promoting student self-monitoring of comprehension	**

Variables	Consensus Rating
Category VI. Implementation, Classroom Instruction, and Climate Variables: (continued)	
VI-C. Quantity of Instruction Variables	
1. Length of school year	
2. Length of school day	*
3. Time on task (amount of time students are actively engaged in learning)	**
4. Time spent in direct instruction on basic skills in reading	**
5. Time spent in direct instruction on basic skills in mathematics	**
6. Time allocated to basic skills instruction by regular classroom teacher	**
7. Time allocated to basic skills instruction by special education teacher	**
8. Difference between academic learning time and allocated learning time	*
9. Time spent out of school on homework	*
10. Time spent out of school viewing educational television	*
11. Time spent out of school in informal learning experiences (e.g., museum trips, scouts)	*
12. Nature of regular classroom content missed by students during participation in pullout programs	*
VI-D. Classroom Assessment Variables	
1. Use of assessments to create detailed learner profiles rather than simple classifications or unlaborated total scores	*
2. Use of assessment as a frequent, integral component of instruction	*
3. Accurate, frequent measurement of basic skills in reading	*
4. Accurate, frequent measurement of basic skills in mathematics	*
VI-E. Classroom Management Variables	
1. Minimal disruptiveness in classroom (e.g., no excessive noise, no students out of place during instructional activities, no destructive activities)	**
2. Group alerting (teaching uses questioning/recitation strategies that maintain active participation by all students)	**
3. Learner accountability (teacher maintains student awareness of learning goals and expectations)	**
4. Transitions (teacher avoids disruptions of learning activities, brings activities to a clear and natural close, and smoothly initiates new activity)	**
5. Teacher "withitness" (teacher is continually aware of events and activities and minimizes disruptiveness by timely and nonconfrontational actions)	**

Variables	Consensus Rating
Category VI. Implementation, Classroom Instruction, and Climate Variables: (continued)	
VI-F. Student and Teacher Interactions: Social Variables	
1. Student initiates positive verbal interactions with other students and with teacher	*
2. Student responds positively to questions from other students and from teacher	**
3. Teacher reacts appropriately to correct and incorrect answers	**
4. Teacher reinforces positive social interactions with students rejected by peers	**
5. Teacher provides explicit coaching on appropriate social behaviors	**
6. Teacher provides explicit coaching to reduce aggression	**
VI-G. Student and Teacher Interactions: Academic Variables	
1. Teacher asks academic questions frequently	**
2. Teacher asks questions predominantly low in difficulty	*
3. Teacher asks questions that are predominantly low in cognitive level	*
4. Teacher maintains high post-question wait time	*
5. Frequent calls for extended, substantive oral and written response (not one-word answers)	*
VI-H. Classroom Climate Variables	
1. Cohesiveness (members of class are friends sharing common interests and values and emphasizing cooperative goals)	*
2. Low friction (students and teacher interact in a considerate and cooperative way, with minimal abrasiveness)	**
3. Low cliqueness (students work with many different classmates, and not just with a few close friends)	*
4. Satisfaction (students are satisfied with class activities)	**
5. Speed (the pacing of instruction is appropriate for the majority of the students)	**
6. Task difficulty (students are continually and appropriately challenged)	**
7. Low apathy (class members are concerned and interested in what goes on in the class)	**
8. Low favoritism (all students are treated equally well in the class, and given equal opportunities to participate)	**
9. Formality (students are asked to follow explicitly stated rules concerning classroom conduct and activities)	*
10. Goal direction (objectives of learning activities are specific and explicit)	**
11. Democracy (all students are explicitly involved in making some types of classroom decisions)	*
12. Organization (class is well organized and well planned)	**
13. Diversity (the class divides its efforts among several different purposes)	*
14. Environment (needed or desired books and equipment are readily available to students in the classroom)	**
15. Competition (students compete to see who can do the best work)	*

DELIVERABLE 3-C

Research Design, Measurement Methodologies, and Procedures Utilized by OSEP-Funded Projects

RESEARCH DESIGN, MEASUREMENT METHODOLOGIES AND PROCEDURES UTILIZED BY OSEP-FUNDED PROJECTS

Sylvia Rosenfield
Stacy Desiderato
Carol Lidz
and
Nancy Zollers

Temple University Center for Research
in Human Development and Education

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ABSTRACT

Research integration in fields in which research is prolific continues to be a problem. In this study a group of expert researchers funded to conduct research on the GEI were interviewed to examine the variables they selected and their procedures for operationalizing them. The variables were arrayed against a framework of variables found to be influential in learning. Issues concerning the procedures researchers follow to select their methods for operationalizing the variables were considered. Needs for technical assistance in this area are presented. Finally, patterns of collaboration and suggestions to facilitate additional collaboration among researchers were elicited.

OPERATIONALIZING THE MARKER-VARIABLE SYSTEM: RESEARCHERS' SELECTION OF MEASUREMENT TECHNIQUES

Much of the literature in any scientific field is contributed by relatively isolated investigators, and the resulting research often consists of a multitude of uncoordinated studies. Attempts then are made to integrate the field using techniques of synthesis such as literature reviews and meta-analyses. However, the synthesis is impeded by the limited scope of the individual studies and of their samples, and the difficulties in aligning the studies either conceptually or methodologically (Bell & Hertz, 1976). According to Bell and Hertz, the problem of integrating research on a given topic particularly needs to be addressed when there is a "quickening of interest in the field, indicating that a large number of studies will soon be carried out, and yet sufficient work has already been done so as to make it possible to establish . . . empirical anchors" (p. 10).

One useful strategy to facilitate integration in such circumstances is to identify marker variables (Bell & Hertz, 1976). A marker variable is defined as "a background variable (not necessarily the focal variable in the study) that is sufficiently relevant to the measures being used by most studies in a defined research area that it facilitates the general alignment of findings from one study to another" (Bell & Hertz, 1976, pp. 8-9). While more substantive than demographic variables, both types of variables are useful to those who attempt to synthesize findings across multiple studies in a given field.

It is recommended by Bell and Hertz that agencies, such as federal offices that support research, would serve the progress of a field of knowledge if they would both encourage and respond to efforts by investigators to join together in achieving better definition of measures and samples and to facilitate collaboration in planning and execution of studies. They believe that support of efforts for collaboration is especially important when "early efforts have burgeoned into a plethora of uncoordinated constructs, techniques, and measures" (p. 11).

This study addresses research collaboration with particular respect to the literature addressing how best to serve the educational needs of at risk and handicapped students. A series of interviews was conducted with senior researchers who were funded to explore the initiative of the Office of Special Education Programs, U.S. Department of Education, concerning a range of instructional and administrative issues in educating learning disabled and mildly handicapped students in general education classrooms. The variables addressed by the researchers were identified and considered in light of a framework of variables important to the learning process. In addition, operationalization strategies of these expert researchers were elicited, and responses related to stimulating and facilitating collaboration among researchers were obtained.

In the past, there have been some attempts to cope with a field of study in which the literature was growing and synthesis was difficult to build. Within the field of child development, for example, there was an attempt to develop methods of aligning studies in intervention with disadvantaged children in the first three years of life. The problem of specifying sample characteristics in a uniform system for all studies was addressed by a small group of investigators, who began by exchanging reports on research results and then turned to develop a uniform set of sample characteristics. A formal project (Gordon, Beller, Lally, Moreno, Rand, & Freiberg, 1973) was supported by the Office of Child Development to standardize methods of measuring socio-emotional variables for this group. Bell and Hertz (1976), in tracing some of the roots of previous attempts to develop marker variable systems, describe two instances in which a group of investigators came together; that of cognitive research (French, Elstrom, & Price, 1963; French, 1973) and of the psychophysiology of sleep (Rechtschaffen & Kales, 1968).

A further example of coordination across studies, in this case provided by the U.S. Department of Education, is the first-grade reading study project (Bond & Dykstra, 1967). In this case the U.S. Department of Education funded multiple studies of first-grade reading instruction, including several distinct approaches, each of them explicated at various sites across the nation. In addition, the Department funded a special project for coordination of the studies under the leadership of Professor Bond and Dykstra at the University of Minnesota. Lead researchers of all projects were convened by Bond and Dykstra. Working committees were formed to seek agreement on efforts for coordination, such as tests that would be used in common across projects to measure instructional outcomes. Procedures for general analysis of data (across projects) were also established. For example, a broad study seeking to identify ATI's (Aptitude Test Interactions) was planned and eventually executed. This effort involved a large number of the nation's top researchers in the field of reading instruction and was carried through with good cooperation and notably good results. It involved all of the researchers in planning and carrying out the coordination. It was definitely not a top down operation, except in the sense that the staff of the Federal sponsoring agency was aware of the need and opportunity for coordination and offered support for the meetings and leadership required to carry through the entire effort.

A data base has been established at MIT into which researchers in child language may deposit their own data and withdraw data from other researchers. According to Butler (personal communication):

> A variety of systems for storing the data in accessible forms (thus also requiring that data be provided to that system in specific coding systems) has permitted researchers in child language (who typically deal in very small N's) to draw from much larger pools of similarly gathered data. A massive study of more than 500 subjects is now being entered into the data base, which combines the resources of researchers at the Harvard Graduate School of Education, those at MIT, and other university-based researchers; all at little or no cost to individual researchers. The MIT program is working well . . . the individual researchers may use combined data in a variety of ways, none are coerced to either provide or utilize the data, there are systems which permit multiple uses, and yet the data base is constrained in manageable ways. Such a "marker system," if you will, demonstrates great potential for collaborative research or for individual use of well-gathered data by others.

Directly related to the content area of this research, Keogh and her colleagues (Keogh, Major-Kingsley, Omori-Gordon, & Reid, 1982) reported an attempt in the field of learning disabilities to encourage cooperation and coordination among researchers. In attempting to synthesize the research on learning disabilities, it became clear that one of the major problems was in the way that the research was reported. The lack of reporting on basic demographic variables and other factors made it difficult to align the studies. The UCLA Marker Variable Guide (Keogh, et al, 1982) was developed as a list of variables or markers to describe samples of subjects in learning disabilities research. The indicators were not to be used as an attempt to limit what research is done or reported, but rather to facilitate "commonality of reporting that will allow determination of samples equivalence" (Keogh et al, 1982, p. 81). Although published in 1982, the Guide has seen little implementation.

More recently, on February 26, 1989, the National Joint Committee on Learning Disabilities produced a statement indicating their concern about the lack of consistency in describing subjects in learning disability research, and provided a list of subject descriptors which they recommended for use in learning disabilities research. International efforts have also been directed towards facilitating syntheses across countries. There is increasing movement, in part sponsored by the United Nations, towards utilizing the same instruments or comparable approaches in measuring mathematics and science achievement across nations (H. Walberg, personal communication).

Current efforts to develop alternatives to educate the mildly handicapped are in a state in which collaboration among researchers and the development of a marker variable system could be beneficial. The so-called GEI (General Education Initiative), or shared responsibility position, conforms to Bell and Hertz's indicator for the ideal time for a marker variable system, i.e., where there has been a quickening of interest in the field, a large number of studies either in progress or being planned, and sufficient work having already been done, making it possible to establish the relevant empirical anchors. In recognition of this state of affairs, this project was funded by the Office of Special Education and Rehabilitative Services to conduct such a process: to synthesize the current state of research and practice, and provide a synthesis of the knowledge base (see Deliverable D, "A Decision-Making Framework for Description of Innovative Education Programs").

Certain assumptions underlie the study, as they relate to methodology. It is assumed that perceived cumulativeness in a research domain is in part a function of certain conventions of evidence and methodology shared by the research community. As Hedges (1987) suggests: "the study of relative cumulativeness across research domains becomes (at least in part) a study of conventions used by the research community for achieving a sense of cumulativeness" (p. 453). As we look for research to inform policy, it is important that inconsistent research results not be primarily due to differences in methodology. While there is no implication here that researchers' independence or freedom to design or operationalize their research should be constrained, the question is being asked if there is some responsibility to look at research procedures to determine where collaboration and agreement might be possible to more readily achieve comparable findings.

Moreover, there is increasing interest in the way that given professionals think about their work. From Schoen's (1983) work on the reflective practitioner to work on teachers' thinking (e.g., Clark & Peterson, 1986), it is a reasonable move to examine the thinking processes of researchers. Examining how expert researchers think about and plan their research might enable us to learn something about this process that would be useful in the teaching of new researchers, as well as in knowing how we might improve the cumulativeness of research in a given field.

A marker variable system (Reynolds, Wang, & Walberg, 1989) has been developed from an extensive and systematic review of the literature. This comprehensive set of variables has been organized into an inclusive conceptual framework of six categories and 228 items. These have been presented to a wide range of stakeholders responsible for research and practice in education. In addition, each item has been rated for the degree of empirical support found for it in the literature (Wang, Haertel, & Walberg, 1989).

The second step in this synthesis is the focus of this study, whose purpose is to examine which of these variables have been utilized in the burgeoning research on the General Education Initiative, and the instrumentation issues involved in their operationalization. Several related questions were asked:

1. Which variables identified as influential in learning have been included in the OSER-funded research on the GEI?
2. How have the variables been operationalized in terms of measurement procedures and instruments?
3. What factors influenced the selection of measurement procedures?
4. How might collaboration among researchers on variable selection and instrumentation be facilitated?
5. What technical assistance needs are common among researchers in the field regarding instrumentation/operationalization of these influential variables?

Method

Subjects

A list of 34 projects, funded for their first year between 1985 and 1988 by the Office of Special Education and Rehabilitative Services, to develop a knowledge base for the GEI, was obtained from the funding agency. The subjects of this study are the Principal Investigators (PI's), or their designated representative(s), who were the recipients of the grants in these competitions. The subjects for this study represent 29 of the 34 projects. A total of 31 individuals were interviewed; for four of the projects, two individuals were interviewed jointly. Three of the individuals interviewed were each funded for two projects. For a variety of scheduling and other reasons, it was not possible to interview anyone from five of the projects.

Procedures

The design of the study involved interview data, collected by telephone, using a structured interview protocol. A list of names, phone numbers, and project abstracts for each research grant funded under the GEI was obtained from OSERS. The original intent had been to conduct much of the process through an evaluation of the grant proposals of the funded projects. However, informal contact with several of the PI's indicated that there had been multiple changes from the original submissions. A pilot project was conducted using written materials and phone contact during the summer of 1988, and presented at a meeting in Washington, DC, conducted by the Center for Research in Human Development and Education staff of this project. Based on feedback from those attending this meeting and other members of the project advisory board, the structured interview protocol was developed.

The interview protocol (found in Appendix A) focused on questions related to the major variables and measurement methodologies utilized. The following were identified for each funded research study:

1. Demographic variables about the sample.
2. Independent and dependent variables.
3. Research procedures for collecting data on each variable;.
4. The reason for selection of the measurement procedure or instrumentation.
5. Strengths and limitations of the instruments.

In addition, other questions were asked related to:

6. Interest/experience of the researchers in collaboration with other researchers, as well as ideas about facilitating research collaboration.
7. Interest and need for additional resources/technical assistance with respect to instrumentation to measure the variables.

An introductory letter was sent to each PI, explaining the nature of the project and requesting participation. (A copy of the letter sent during the second phase of interviews is included in Appendix A). The letter was followed by a phone call to the PI's, confirming their interest in participating in the interview process, inviting them to designate themselves or a senior researcher on the project for that purpose, as well as setting a time convenient to interviewers and interviewees. The interviews were designed as structured conversations between researchers, i.e., interviewer and interviewee, and were conducted in a conversational format between colleagues about research.

Three research associates conducted the interviews. One interview was conducted to pilot the interview protocol, and two additional interviews were conducted jointly by the interviewers to promote standardization of the format. The remaining interviews were conducted individually. The interviewers completed the written protocol, which was then coded for analysis.

Results

Research Variables

The first question addressed which variables identified as influential in learning have been included in the OSER-funded research on the GEI. Each demographic, independent and dependent variable was identified and coded for 28 projects (the results of one project interview were received too late to be included in this analysis) according to the Marker Variable Framework described by Reynolds, Wang, and Walberg (1989). When a variable did not fit the original framework, it was coded as a new item. All variables were coded within the six categories used in the framework, but 23 new items were developed. Appendix B consists of a copy of the complete framework, so that the number of variables not included as well as those found in these studies can be seen. The mean number of variables per study was 11.5; the range varied from 2 to 24. Data from five interviews were coded, separated by two raters to determine reliability. A coder reliability of .88 was obtained.

Demographic Variables

One of the major concerns in development of a marker variable system for research is the presentation of consistent background and demographic data in all studies relevant to the same topic. In the 28 projects analyzed, the mean number of demographic variables was 5.07, with a range of 0 to 14 demographic variables collected by the researchers.

However, the specific demographic data gathered varied widely. The highest consistency is over relatively few categories, including: type of district, i.e., suburban/rural/urban; type of school, i.e., public/private; special education classification; grade level; socio-economic status; gender; and ethnicity. Only three (gender, classification, and grade level) were found in half or more of the studies. The demographic information generally was collected from school records, and some researchers expressed some concern about accuracy of data.

In all but one study the school system's special education classification of the student was accepted, and it was unclear if the basis for the classification would be presented to readers of the research. Given the documented variability of classification systems across schools, there is cause for concern when we come to ask what type of population a program has been demonstrated to serve.

Variables by Category

A second question involves which of the variables in the Marker Variable System have been pinpointed for study by these funded grants. The frequeny count for variables will be presented in terms of the 6 categories and 30 subcategories, rather than the 228 specific items (although these data are available in Appendix B). None of the studies included variables from category 1, State and District Variables; 15 of 28 included variables in category 2, Out of School Contextual Variables. Of these, 12 studies only included Community Variables (consisting almost entirely of the Suburban, Rural, Urban item), although three had variables in the Home Environment and Parental Support Subcategory. In addition, the research studies examined variables in the other categories as follows: 22 of 28 studies for category 3, School Level Variables; 27 of 28 for category 4, Student Variables; 6 of 28 for category 5, Program Design Variables; and 17 of 28 for category 6, Implementation, Classroom Instruction, and Climate Variables. Currently, school and student variables are the major focus of the research, which is appropriate given the nature of the GEI initiative under which these grants were funded.

Instrumentation

Specific to this study are the questions relating to measurement and instrumentation. The data were arrayed to determine if the same variable is being assessed in different ways by the different researchers. Table 1 shows that 72 variables were assessed by researcher-created instruments, in comparison to 48 variables assessed through published instruments. Tables 2 and 3 indicate the number of different achievement and observation measures in use in these studies. Table 4 shows the number of times individual instruments were used across studies. Academic achievement demonstrates this variety. Reading achievement, a common variable in the studies, was measured by group achievement tests, including: CTBS, Stanford Achievement, Metropolitan, Iowa Test of Basic Skills, and the California Achievement Test. Individual tests were also used, including the WRAT and the Woodcock-Johnson, as well as curriculum-based assessment and curriculum-based measurement techniques. In addition, some studies used grades or teacher rankings.

A perceived need to examine the data more qualitatively was clear among these researchers, many of whom collected some qualitative data. Given the recent interest in qualitative data (see also the interest in qualitative data as a topic for technical assistance conferences, listed in Table 6), it is hard to know if the use of this method reflects the current research "Zeitgeist", the problems of this area of research or some combination of the two. It should be noted that most of the research studies used multiple data collection sources for the different variables. Classroom observation, interview data, questionnaires, standardized and curriculum based assessment/measurement techniques were often found in the same study.

The reasons for selecting the instrumentation methodology were also obtained. Table 5 rank orders the reasons for the selection of methodology for 18 PI's selection of 125 measurement strategies. Some researchers reported one reason for a selection, while giving multiple reasons for others. The two most frequent reasons, ease of use and the need to create the technique for the study because nothing else was available suggest both the autonomy of the researchers and the difficulty of doing research in the schools.

Technical Assistance

The PI's were asked to suggest the kinds of technical assistance they would have found helpful. Table 6 displays the results of that question. The need for technical assistance around qualitative methodology was apparent. In addition, there was an interest in simply having the opportunity to share ideas and problems, as well as techniques.

Collaboration

Finally, questions were raised about the level of collaboration among researchers. Table 7 demonstrates that considerable collaboration is already ongoing among these researchers. While joint data collection and instrument sharing is less common, as a group they were interested in more opportunities to share and provided numerous suggestions to facilitate that process. Table 8 documents these suggestions. Several of the suggestions could be implemented by the funding agencies when research grants on a common problem are to be funded. Table 9 includes some additional issues and concerns raised by the researchers.

Discussion

The results of these interviews with this expert group of researchers raise a number of implications and policy considerations. Using the Marker Variable System as a framework, it is possible to evaluate which variables related to learning have received more versus less attention for a given population or problem. It would appear, for example, that little work has been done so far around parental factors related to the GEI. Secondly, the issue of common demographic and marker variables has not yet been addressed in the special education research literature, in spite of the apparent need for such consensus and the pioneering work done by Keogh early in the 1980's. Reaching consensus on some common variables across studies, as well as clarifying how to define special education and at risk populations across studies, rather than relying on definition by individual idiosyncratic school classification systems, is likely to benefit the development of research integration and has been attempted in other research areas.

Issues of instrumentation also need further consideration. Studies of the comparability of techniques presuming to measure the same variable would resolve some of the problem. Perhaps some conventions among researchers regarding the nature of and conditions in which variables such as time-on-task are measured would improve the literature considerably. Are there some variables that need to be "standardized" in terms of common meanings and comparable measurement procedures? Because of the energy and commitment of several individuals, some movement toward joint instrument use and shared data collection has begun among this group of funded projects. Two of the interviewees also mentioned consortia around research outside this particular group of projects. Collaboration within schools has become an emerging theme of the school reform movement, and perhaps the interest displayed by the researchers in further collaboration is a reflection of the times as well as their recognition of the benefits to be obtained. It might also be useful to explore how other such groups of researchers managed to reach consensus regarding meaning and measurement operations.

Many of the reasons given for the selection of the type of instrumentation reflected the "5 minutes, 5 cents rule": the measurement needs to be easy to administer, economical, and brief. This is a realistic concern. The researchers were all working in the real world (how researchers enter schools and districts is another issue worth investigating) and were working with school personnel whose main focus was not research. Although these concerns are realistic, they do not invalidate the need to monitor that the purpose or goal of the research does not become subordinate to feasibility issues. This is a difficult line, requiring considerable researcher skill. The need to develop school/research collaboration is clearly illuminated by these researchers' difficulties in gaining cooperation. Strategies such as small gifts, using instrumentation that would provide useful feedback to the school personnel, and ease and speed of administration were strategies described by the researchers. Most of these researchers acknowledged how difficult it was to try to do good research within the confines of their funding and the problems in gaining cooperation from the schools. Collecting data for applied research in field situations is a difficult process, in which measurement issues sometimes rank second to the realities of the school culture and need to be carefully balanced by experienced researchers. Perhaps we need to consider how to make the schools more of a joint collaborator in the research process. Porter (1987) describes a pioneering collaboration effort between university researchers and teachers, which suggests integrating practitioners more directly and at an earlier point into research projects.

The researchers also made a number of suggestions to funding agencies to encourage a culture of support among researchers. Several suggested providing opportunities to collaborate early in the projects, through meeting and through sharing information and instruments. They recommended using major conferences as opportunities for additional meetings. They asked for incentives to collaborate, rather than compete. Given the competition inherent in the grant process, these researchers recognized the need to build a climate of trust. The development of research networks was seen as a possible facilitating strategy by one individual. This role of strengthening collaboration and building integration may be a function that is not usually included in describing the mission of funding agencies (see, for example, Friedman & Baldin, 1990), but its incorporation might result in important gains across a field.

The research reported here has a number of methodological limitations. The interview process was often lengthy and time consuming for the interviewee. This was particularly true when the researchers, in several cases, had several extensive projects on which to report. One researcher indicated in a later contact that he had only reported the major variables, in spite of the request to identify all the variables, and that there were additional demographic variables that he had not discussed over the phone. An additional step in the procedure would require that the researchers each receive a table of all their responses, so that the data could be verified by them. It was determined that this would impose too great a burden on the researchers, who had been willing to donate their time for the phone interviews. The data must be interpreted in light of these limitations.

Conclusions

The results of this study suggest some future directions for the research community in special education and the institutional structures which support research. The researchers provided a number of specific suggestions for funding agencies and organizations to foster collaboration and improve the comparability of the research literature. While clearly some of these suggestions are already being implemented, additional support is worth consideration if there is to be a more integrated and meaningful research literature in special education. Individual autonomy and creativity should continue to be highly valued by the education community. Finding ways to work together to share information and instrumentation could, however, also become a valued priority.

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Table 1

Instrumentation (N=20 Projects)

File data: 73 variables

Instrumentation created for the study: 72 variables

Published instruments: 48 variables

Table 2

Achievement Measures (N=20 Projects)

Standardized Group Achievement Tests	
CBTS	2
SAT	2
MAT	4
ITBS	1
CAT	3
State Level Tests	1
Local Choice	1
Individual Achievement Tests	
Bass	2
CBM	4
CBA	1
WRAT (Spelling)	1
Richardson Decoding Skill Tests	1
Woodcocks-Johnson	1
Other (e.g., grades, teacher ranking, criterion-referenced):	9

Table 3

Classroom Observation Measures (N=20 Projects)

CISSAR	4
MELD	1
Modified MELD	1
SOBER	1
TIES	1

Table 4

Multiple Use of Published Instruments (N=20 Projects)

Number of Instruments used in four studies: 3

- CISSAR
- MAT
- CBM

Number of instruments used in three studies: 2

- Harter Self-Perception Scale for Children
- CAT

Number of instruments used in two studies: 6

Number of instruments used in one study: 23

Table 5

Ranking of Reason for Selection of Research Instruments

Created for study

Easy to use

Validity and reliability

Used previously by researcher
Requires little time
Theoretical relationship to construct

Instrument used in district

Sensitive to small changes

Need for qualitative data to compare with previous data
as part of common data set with another research project

Only instrument available for this variable
Face validity for teachers

Provides both research data and information for teachers
Teacher administered
Selected in collaboration with school personnel
Required in RFP
Curious about measure

(N=18 project directors for 125 measures)

Table 6

Types of Technical Assistance Requested by Project Directors

Conferences on specific topics:	
Ethnographic/qualitative research	9
implementation	4
Training in utilizing specific instrument/measurement techniques:	
Classroom observation systems	4
Academic achievment measures	3
Consultation	3
Research design and analysis	3
Sustaining innovations	2
Adapting instruments to answer specific research questions	1
Methods for measuring growth and change in handicapped children	1
Discussion about appropriate outcome measures	1
Procedural issues in collecting data in schools	1
Sharing opportunities among researchers:	
To avoid re-inventing the wheel	3
To provide opportunity to discuss problems/issues	2
Field needs more instrumentation for school-based research	1
Need for more technical assistance in general	1
A lab where standardized training on research instruments is available	1
Provision of "blinded" test administration, available on contact	1

Table 7

Forms of Researcher Collaboration

Discussion with othe researchers	20
Discussion with other researchers specifically about instrumentation	9
Collaboration among researchers:	
Sharing instruments	10
Common data collection	8
Joint authorship and presentations	1
Collaboration between researchers and school personnel	1
Leadership in building researcher network	1

Table 8

Researchers' Suggestions to Facilitate Collaboration

Suggestions to Funding Agencies:	
1. Provide opportunities for collaboration early in projects	5
2. Build consortia around common problems, with funding for collaboration	4
3. Share written information and instruments of similar projects	2
4. Provide incentives and contingencies for collaboration	1
Other Suggestions:	
5. Convene conferences on topics of interest	3
6. Utilize major conferences (such as CEC, AERA) for opportunities to meet	1
7. Develop climate of trust, including trusted leadership	4
8. Joint authorships, with senior authorship rotated	1
9. Consider time pressures on researchers	1

Table 9

Additional Issues/Concerns Raised by Researchers

1. Collaboration should not be forced (2)

2. There is a need for more theoretical discussions in the field (1)

3. There needs to be more tolerance for divergent approaches (such as quantitative research) by funding agencies (2)

4. There needs to be recognition of how "needy" schools are; asking schools to be collaborative in research, given their own needs, is inappropriate. Funds should be built in to reward schools for participation in research (1)

APPENDIX A

LETTER TO PROJECT DIRECTORS AND INTERVIEW PROTOCOL

APPENDIX A

October 31, 1989

^F1^

Re: ^F2^

Dear ^F3^,

This is a follow-up to a letter that we sent to you last year regarding the above-named project, which is funded by the Office of Special Education Programs (OSERS) to examine a range of instructional and administrative issues in educating learning disabled and mildly handicapped students in general education classrooms. We were not able to schedule an interview with you at that time, but would now like to arrange a time to speak with you about this project.

As we indicated in the previous letter, the Temple University Center for Research in Human Development and Education was funded to synthesize the state of the field and the literature on important variables that influence student learning. To this end, we are gathering information on research methodology and research development across projects relating to these variables. We are now in the final phases of data collection for this project, and wish to arrange for your participation.

During the next month, Carol Lidz and I will conduct telephone interviews with the researchers from the OSERS-funded projects who have not yet been contacted to learn about the research questions and methodologies, data collection plans, and activities across the states. These interviews take approximately one hour. At the conclusion of this process, all project researchers who express an interest will receive a brief report of our findings.

There are several appointment times, mostly on Monday and Wednesday mornings, that are available throughout November. Veronica Norris from our office will be calling you in the next few days to schedule a time that is mutually convenient. If any of the prescheduled times is not convenient, please indicate to her the best times to reach you.

We are aware that your projects are in various stages of implementation, and that some of you will answering interview questions either prospectively or retrospectively. Either point of view is fine. In brief, we will be asking you about the following:

-on what variables have you, or are you planning on, collecting your data?

-what instruments are you or are you planning on using?

-why did you choose these particular instruments?

-have there been any barriers to data collection, or do you anticipate any?

In addition to these questions, we can include any issues concerning instrumentation that you may wish to discuss.

Thank you for your interest and willingness to participate, we look forward to spending time on the telephone with you during the next month.

Sincerely,

Sylvia Rosenfield
Senior Research Associate
Professor of School Psychology

SR/ab

Synthesis Interview Protocol :
Research Instrumentation

Name of Interviewer:____

Date of Interview: _________________________

Introduction: We appreciate you giving us this time. The synthesis project is looking at the methodologies used by some of the major researchers in terms of instrumentation. We hope to make this as brief and as interesting as possible. We will be taping and taking notes.

1. Project Name:

2. Project Director:

3. Project Personnel Interviewed (Name and Title):

4. Date of Interview:

5. Phone Number:

6. Address:

7. Dates of Project:

8. Geographic Location:

For Each Variable, collect information on items 9-16. Refer to Logistics in Practice form..

17. What kind(s) of technical assistance with respect to instrumentation would you find helpful?

Are you interested in conferences:
  On particular topics:
    consultation/implementation
    ethnographic/qualitative data?
    Other (specify):

Who would you like to have attend/present?

Other:

18. What kinds of collaboration with other researchers are you engaged in related to this project.

Sharing instruments _______________

Discussion about:
  Literature _______________
  Findings _______________
  Instruments _______________
  Data Analysis _______________
  Common Data Collection _______________

Joint Presentation of Findings _______________

Other (Specify):

19. What do you believe would lead to increased collaboration on the use of similar instrumentation and/or common data collection among researchers in this field?

20. Additional Comments:

1.

Project Name:

Instrumentation Survey

Logistics in Practice

9. Code ______

10. Type of Variable (circle one) DV IV DGV U

Variable	13. Measure	14. Reason for Selection	15. Strengths	16. Limitations
11. Variable Label 12. Instrument(s)	___ Direct observation ___ Permanent product ___ Questionnaire ___ Rating scale ___ Standard test ___ Criterion reference measure ___ Classroom observation scale ___ Anecdotal recording ___ Interview	___ Convenience ___ Accessibility ___ Instrument constructed for service ___ Clinical utility ___ Theoretical construct favored ___ Psychometric properties ___ critical variable ___ acceptable ___ not an issue ___ Established measure in literature ___ Previous knowledge of experimenter		

APPENDIX B

INFLUENTIAL VARIABLES IN LEARNING INCLUDED IN TWENTY-EIGHT FEDERALLY FUNDED RESEARCH PROJECTS ON THE GEI

I: State and District Variables

	Number of Studies
District Level Demographics and Marker Variables	
School district size	______
Degree of school district bureaucratization	______
Degree of school district centralization	______
Presence of contractual limits on after school meetings	______
Presence of contractual limits on class size	______
Presence of contractual restrictions on activities performed by aides	______
Degree of central office assistance and support for programs	______
Degree of board of education support for instructional programs	______
Per pupil expenditure	______
Efficiency of transportation system	______
State Level Policy Variables	
Teacher licensure requirements	______
Degree of state control over textbooks	______
Degree of state control over curriculum	______
Academic course and unit requirements	______
Minimum competency testing requirements	______
Adherence to least restrictive environment/mainstreaming	______

II: Out of School Contextual Variables

Community Variables

Socioeconomic level of community	2
Ethnic mix of community	
Quality of social services for students	
Rural/Urban/Suburban	11

Peer Group Variables

Level of peers' academic aspirations	
Level of peers' occupational aspirations	
Presence of well defined clique structure	
Degree of peers' substance abuse	
Degree of peers' criminal activity	

Home Environment and Parental Support Variables

Educational environment (e.g. number of books and magazines in home)	
Parental involvement in assuring completion of homework	
Parental involvement in assuring regular school attendance	
Parental monitoring of student television viewing	1
Parental participation in school conferences and related activities	1
Parental application of appropriate, consistent discipline	
Parental expressions of affection to children	
Parental interest in student's school work	1
Parental expectation for academic success	
Parental Involvement	2
Parental Satisfaction with School Program	2
Family Constellation	1

Student Use of Out of School Time Variables

Student participation in clubs and extracurricular school activities	
Amount of time spent on homework	
Amount of time spent on leisure reading	
Amount of time spent viewing educational television	
Amount of time spent viewing noneducational television	

III: School Level Variables

Demographic and Marker Variables

Public versus private school	11
Size of school	4
Level of Chapter I (compensatory education) funding	
Level of Title VII (bilingual) funding	
Level of PL 94-142 (handicapped) funding	
Mix of socioeconomic levels in the school	3
Mix of cultural/ethnic groups in the school	3
Mix of student language backgrounds in the school	
Teacher age	1
Teacher degree	2
Teacher experience	2
Teacher competence	1

Teacher/Administrator Decison Making Variables

Teacher and administrator consensus on school values, norms, and roles	
Principal actively concerned with instructional program	2
Teacher involvement in curricular decision making	
Teacher involvement in instructional decision making	2
Teacher involvement in resource allocation decisions	
Teacher involvement in finding ways to increase academic performance	4
Teacher confidence in handling problems	3

School Culture Variables (Ethos Conducive to Teaching and Learning)	
Use of cooperative, not exclusively competitive, goal structures	
School-wide emphasis on and recognition of academic achievement	
Low staff absenteeism	
Low staff turnover	
Low staff alienation	
Active collaboration between regular classroom teachers and special education teachers	3
Safe, orderly school climate	
Degree of school personnel professional collaboration	5
Rate of referrals to special ed	3
Staff satisfaction	5
Concerns regarding change	1
Teacher expectations/tolerance for student behavior	2
School-Wide Policy and Organizational Variables	1
Presence of "effective schools program"	3
Explicit school grading and academic progress policies	
Explicit school-wide discipline policy	
Explicit school-wide attendance policy	
Coordination of pullout programs for handicapped students with regular instructional programs	1
Use of multi-age grouping	
Use of instructional teaming	2
Use of cross-age tutoring	
Use of peer tutoring	2
Use of academic tracking for specific school subject areas	
Minimization of external classroom disruptions (e.g., broadcast announcements)	
Adherence to least restrictive environment/mainstreaming	1
Minimum use of suspension and expulsion as discipline tools	

Accessibility Variables	
Accessibility of educational program (overcoming architectural, communication, and environmental barriers)	
Parental Involvement Policy Variables	
Parental involvement in improvement and operation of instructional programs	
School-sponsored parenting skills workshops (e.g., behavior modification, Parent Effectiveness Training)	

IV: Student Variables

Demographic and Marker Variables	
Chronological age	6
Socioeconomic status	12
Gender	14
Ethnicity	10
First or native language	5
Physical and health status	
Special education classifications (e.g., EMR, LD)	16
Grade level	15
At risk	1
Birthorder	1
History of Educational Placements	
Prior grade retentions	4
Prior special placements	6
Current placement in regular class versus self-contained special education class	3
Age/Grade match	1
Social and Behavioral Variables	3
Positive, nondisruptive behavior	6
Appropriate activity level	1
Cooperativeness with teacher	3
Cooperativeness with peers	4
Ability to make friends with peers	2

Motivational and Affective Variables	3
Attitude toward school	
Attitude toward teachers	
Attitude toward subject matter instructed	
Motivation for continual learning	1
Independence as a learner	
Perseverance on learning tasks	
Self-confidence	
Academic self-competence concept in subject area instructed	1
Attributions for success and failure in subject area instructed	
Self-concept	4
Cognitive Variables	1
Piagetian stage of cognitive development	
Level of reasoning (fluid) ability	
Level of spatial ability	
Memory	
Level of general academic (crystallized) knowledge	5
Level of specific academic knowledge in subject area instructed	13
Level of reading comprehension ability	6
Level of writing ability	
Level of computational ability	3
Level of oral fluency	3
Level of listening skills	1
Learning styles (e.g., field independent, visual/auditory learners, high cognitive complexity)	
Level of spelling	2
IQ	6
Learning potential	1
Language level	1

Metacognitive Variables

Self-regulatory, self-control strategies (e.g., control of attention)	1
Comprehension monitoring (planning; monitoring effectiveness of attempted actions; monitoring outcomes of actions; testing, revising, and evaluating learning strategies)	____
Positive strategies for coping with failure	____
Positive strategies to facilitate generalization of concepts	____

Psychomotor Variables

Psychomotor skills specific to area instructed	____

V: Program Design Variables

Demographic and Marker Variables

Size of instructional group (whole class, small group, one-on-one instruction)	1
Proportion of students with special needs served in regular classes	1
Number of classroom aides required	____
Resources needed	____

Curriculum and Instructional Variables

Clearly presented academic, social, and attitudinal program goals/outcomes	____
Use of explicit goal/objective setting for instruction of individual student (e.g., Individualized Educational Plans [IEPs])	2
Use of mastery learning techniques, including use of instructional cues, engagement, and corrective feedback	____
Use of cooperative learning strategies	____
Use of personalized instructional program	____
Use of prescriptive instruction combined with aspects of informal or open education	____
Use of diagnostic-prescriptive methods	____

Curriculum and Instructional Variables (continued)	
Use of computer-assisted instruction	
Use of crisis management techniques to control classroom disruptiveness	
Use of program strategies for favorable affective climate	
Alignment among goals, contents, instruction, assignments and evaluation	
Curriculum units integrated around key discipline-based concepts	
Use of multidisciplinary approaches to instructional planning (including diagnosis in educational planning)	
Presence of information in the curriculum on individual differences and commonalities (including handicapping conditions)	
Presence of culturally diverse materials in the curriculum	
Curriculum Design Variables	2
Materials employ alternative modes of representation	1
Material is presented in a cognitively efficient manner	1
Materials employ explicit and specific objectives	
Materials employ advance organizers	1
Materials employ learning heirarchies	
Materials are tied to assessment and diagnostic tests	1
Availability of materials and activities prepared specifically for use with whole classroom, small groups, or one-on-one instruction	1
Degree of structure in curriculum accommodates needs of different learners	1
Student interests guide selection of a significant portion of content	
Availability of materials and activities for students with different abilities	

Curriculum Design Variables (continued)

Availability of materials and activities for students with different learning styles	
Developmental issues considered	
Student experiences considered	

VI: Implementation, Classroom Instruction, and Climate Variables

Classroom Implementation Support Variables

Creation and maintenance of necessary instructional materials	
Adequacy in the configuration of classroom space	
Availability of classroom aides	
Use of written records to monitor student progress	
Establishing efficient classroom routines and communicating rules and procedures	1
Developing student self-responsibility for independent study and planning of one's own learning activities	

Classroom Instructional Variables	3
Prescribing individualized instruction based on perceived match of type of learning tasks to student characteristics (e.g., ability, learning style)	1
Use of procedures requiring rehearsal and elaboration of new concepts	
Use of clear and organized direct instruction	
Systematic sequencing of instructional events and activities	
Explicit reliance on individualized educational plans (IEPs) in planning day-to-day instruction for individual students	
Use of instruction to surface and confront student misconceptions	
Use of advance organizers, overviews, and reviews of objectives to structure information	
Clear signalling of transitions as the lesson progresses	1

Classroom Instructional Variables (continued)

Significant redundancy in presentation of content	
Teacher conveys enthusiasm about the content	
Directing students' attention to the content	
Using reinforcement contingencies	1
Setting and maintaining clear expectations of content mastery	1
Providing frequent feedback to students about their performance	1
Explicitly promoting effective metacognitive learning strategies	
Promoting learning through student collaboration (e.g., peer tutoring, group work)	1
Corrective feedback in event of student error	
Flexible grouping that enables students to work to improve and change status/groups	
Teaching for meaningful understanding	
Degree to which student inquiry is fostered	
Scaffolding and gradual transfer of responsibility from teacher to student	
Degree to which assessment is linked with instruction	
Skills taught within the context of meaningful application	
Good examples and analogies to concretize the abstract and familiarize the strange	
Consideration of the teacher's use of language in the instructional process	1
Explicitly promoting student self-monitoring of comprehension	

Quantity of Instruction Variables

Quantity of Instruction Variables	1
Length of school year	
Length of school day	
Time on task (amount of time students are actively engaged in learning)	8

Quantity of Instruction Variables (continued)

Time spent in direct instruction on basic skills in reading	
Time spent in direct instruction on basic skills in mathematics	
Time allocated to basic skills instruction by regular classroom teacher	
Time allocated to basic skills instruction by special education teacher	
Difference between academic learning time and allocated learning time	
Time spent out of school on homework	
Time spent out of school viewing educational television	
Time spent out of school in informal learning experiences (e.g., museum trips, scouts)	
Nature of regular classroom content missed by students during participation in pullout programs	
Attendance	1
Tardiness	1

Classroom Assessment Variables

Use of assessments to create detailed learner profiles rather than simple classifications or unelaborated total scores	1
Use of assessment as a frequent, integral component of instruction	1
Accurate, frequent measurement of basic skills in reading	
Accurate, frequent measurement of basic skills in mathematics	

Classroom Management Variables

Minimal disruptiveness in classroom (e.g., no excessive noise no students out of place during instructional activities, no destructive activities)	
Group alerting (teacher uses questioning/recitation strategies that maintain active participation by all students)	
Learner accountability (teacher maintains student awareness of learning goals and expectations)	
Transitions (teacher avoids disruptions of learning activities, brings activities to a clear and natural close, and smoothly initiates new activity)	

Classroom Management Variables (continued)

Teacher "withitness" (teacher is continually aware of events and activities and minimizes disruptiveness by timely and nonconfrontational actions) ____

Student and Teacher Interactions: Social Variables __2__

Student initiates positive verbal interactions with other students and with teachers ____

Student responds positively to questions from other students and from teacher ____

Teacher reacts appropriately to correct and incorrect answers ____

Teacher reinforces positive social interactions with students rejected by peers ____

Teacher provides explicit coaching on appropriate social behaviors ____

Teacher provides explicit coaching to reduce aggression ____

Student and Teacher Interactions: Academic Variables

Teacher asks academic questions frequently __1__

Teacher asks questions predominantly low in difficulty ____

Teacher asks questions that are predominantly low in cognitive level ____

Teacher maintains high post-question wait time ____

Frequent calls for extended, substantive oral and written response (not one-word answers) ____

Classroom Climate Variables

Cohesiveness (members of class are friends sharing common interests and values and emphasizing cooperative goals) __1__

Low friction (students and teacher interact in a considerate and cooperative way, with minimal abrasiveness) ____

Low cliqueness (students work with many different classmates, and not just with a few close friends) __1__

Satisfaction (students are satisfied with class activities) __1__

Speed (the pacing of instruction is appropriate for the majority of the students) ____

Task difficulty (students are continually and appropriately challenged) ____

Classroom Climate Variables (continued)

Low apathy (class members are concerned and interested in what goes on in the class) _____

Low favoritism (all students are treated equally well in the class, and given equal opportunities to participate) _____

Formality (students are asked to follow explicitly stated rules concerning classroom conduct and activities) _____

Goal direction (objectives of learning activities are specific and explicit) _____

Democracy (all students are explicitly involved in making some types of classroom decisions) _____

Organization (class is well organized and well planned) _____

Diversity (the class divides its efforts among several different purposes) _____

Environment (needed or desired books and equipment are readily available to students in the classroom) _____

Competition (students compete to see who can do the best work) _____

DELIVERABLE 3-D

Variables Important to Learning: A Knowledge Base for Special and Regular Education

DELIVERABLE 3-D

VARIABLES IMPORTANT
TO LEARNING: A KNOWLEDGE BASE FOR
SPECIAL AND REGULAR EDUCATION

by

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ABSTRACT

The study began with a "meta-review" of the research literature in special and regular education. Results were summarized in the form of a 228-item survey questionnaire. A Delphi Survey of a panel of experts and other surveys of eight groups of educators followed. Results showed a very high degree of consensus about variables considered important for creating learning environments, especially among regular education and special education teachers.

INTRODUCTION

Clearly a restructuring of the place of special education within the schools is occurring. A major feature of the process has been described as progressive inclusion (Reynolds & Birch, 1988); that is, the gradual increase in the numbers and proportions of handicapped children who receive their special education while enrolled in regular classes and schools. Some educators believe the progress is too slow and the inclusiveness too limited (Gartner & Lipsky, 1987; Stainback, Stainback, & Forest, 1989) while others see it as too rapid and based on arguable assumptions (Kauffman, Gerber, & Semmel, 1988; Vergason & Anderegg, 1989). But everyone appears to agree that to the extent that high quality integrated special education is to be achieved there must be strong teamwork by educators of all kinds.

This report discusses findings from a study of the knowledge bases for both regular and special education. Among the questions addressed in the study were: What are the conditions that enhance the learning of children? and To what extent are such conditions judged to be different by teachers of handicapped and of nonhandicapped children and by other educators? In a research review reported in 1986, Brophy concluded that students from disadvantaged backgrounds and many special education students need more instruction than others but not a different kind of instruction. If that finding is sustained, the implications for special and regular teacher preparation and for program structure are important.

The study looks broadly at the research literature in order to specify the well-confirmed knowledge about school learning and then asks various groups of specialists to make judgments about the importance of the identified variables or principles in their work. The idea is to ascertain whether we have one or several distinct knowledge bases to be considered as progressive inclusion proceeds. To the extent that special and regular educators work from common bases of knowledge, there is added reason to press toward merger, at least in teacher preparation, rather than for separation.

It is important to note that the study focused on alterable variables; that is, conditions that educators have some chance of changing in ways that enhance learning. Not considered were variables such as chronological age and socio-economic status which are static or relatively so and largely impervious to the influence of teachers. Literature in highly distinct fields, such as education for students who are blind or deaf, treatment of major affective disorders, therapy for speech disorders, and education for severely and profoundly disabled students, was not covered thoroughly. Thus, findings will be applicable mainly to the milder degrees of disability. Furthermore, the study dealt only with declarative knowledge in a limited domain, concerned mainly with pedagogical principles. It did not include knowledge of subject matter to be taught (history, geography, mathematics, etc.); and it did not include consideration of legal and ethical principles. It considered what teachers should know, but not how they should learn it or when to use it.

THE LITERATURE REVIEW

The study began with a comprehensive "meta-review" and synthesis of research on variables relating to school learning. The review covered literature in both regular and special education, including, for example, the chapters in the review volume sponsored by the American Educational Research Association Handbook of Research on Teaching (Wittrock, 1986); the three-volume Handbook on Special Education: Research and Practice (Wang, Reynolds, & Walberg 1987, 1988, 1989); Designs for Compensatory Education (Williams, Richmond, & Mason, 1986); and the annual review series published in education, special education, psychology, and sociology. Considered, in total, were 86 chapters from annual review series, 44 handbook chapters, 20 government and commissioned reports, 18 book chapters, and 11 review articles in journals.

A total of 228 variables considered to be important to school learning were identified through the literature review. More than 10,000 separate statements about the strength of associations between the variables and student learning were tabulated, then reduced to 3,700 summary ratings. (For a detailed summary of the findings from this research synthesis, see Wang, Haertel, & Walberg (1989)).[1] The 228 variables were then organized in the form of a questionnaire.

THE DELPHI SURVEY

The next step was to conduct a Delphi Survey, using the survey questionnaire with a 12-member national panel of researchers and leading practitioners.[2] The aim was to get the judgments of a representative group of leading experts about teaching and learning. They were asked to rate each item for importance in the learning of children and to add, delete, and suggest changes in items. A somewhat revised set of items was used in a second round of the Delphi Survey and in a broader set of surveys with other groups. Tables 1 and 2 show examples of the variables included in the survey.

Table 1 lists the 20 variables that were rated as highly important by the 12-member panel of experts. Each of the 20 items was rated "high" (on a scale of 1 to 3) by at least 10 of the 12 experts. It is of interest to note that there were no significant changes from round 1 to round 2 in the Delphi procedure. The 20 variables that were rated by experts as highly important are clustered under four of the six major categories included in a conceptual model drawn from extant findings on factors affecting student learning. The model (Wang, 1986) is grounded on the assumption that each learner brings to the school learning environment a unique profile of instructionally relevant student characteristics (e.g., level of use of learning strategies, reading comprehension ability, attitudes toward learning, level of general academic knowledge) that interact with features of the instructional program, the support system, and classroom management and climate. The conceptual framework included two other categories of variables -- degree of implementation of the instructional program and local demographics -- that produced no items in the "top 20," as rated by the panel of experts.

Table 2 lists an additional 20 variables, all of them falling under the instruction rubric, which the panel of experts rated as important (a mean rating of above 2.5), but which fell below "top 20" level. Taken together, the

40 variables listed in Tables 1 and 2 begin a specification of variables to be taken into account in teacher preparation and in arranging instruction for children. Whether various sub-groups of educators see the situation similarly is discussed in the following section.

THE BROADER SURVEY OF CONSENSUS FROM THE FIELD

To investigate questions about consensus among various educators on variables considered important, eight groups of professionals were formed and asked to respond to the survey (see Table 3). Through the cooperation of the Council for Exceptional Children (CEC) a random sample of 1001 teacher members of CEC was obtained; all are special educators. Surveys were sent to them; 449 (45%) responded. Each of the special education teachers was asked to recruit as an additional respondent the "regular" teacher whose classroom was nearest to his/her own classroom; 182 regular teachers responded. A sample of 526 school psychologists was selected randomly from the membership list of the National Association of School Psychologists; 207 (39%) responded. Each psychologist was asked to recruit a school principal in a building they served. Ninety-one school principals responded. All state and territorial directors of special education and of Chapter I programs were asked to complete the survey which they did at relatively high rates: 66% (N = 37) and 59% (N = 41), respectively. A group of special education researchers was created by assembling names of recipients of federal research grants in the field of special education relating to services for mildly handicapped students in regular education settings; 55 of 197 (28%) responded. A final category of education researchers/authors was created by assembling names of first authors of 134 major chapters in the various research reports and reviews used in the "meta-review" aspects of the study; 61 (46%) responded.

Table 4 reports the Pearson Product Moment correlation coefficients among mean ratings of the 228 items by the eight educator groups. It may be noted, for example, that the correlation of mean ratings by regular and special education teachers was .95. That was the highest correlation observed. All correlations tended to be high, the median among 28 correlations being .88. The lowest correlation (.77) was between State Directors of Special Education and Education Researcher/Authors. Considering the entire matrix of correlations, it seems fair to conclude that there is a very high degree of consensus among such educator groups as studied here about the variables that are important in attempts to enhance the learning of children in school. Judged by correlational analysis there is remarkable similarity in the views of special and regular teachers about principles to be considered in their teaching.

The responses of the eight educator groups and the panel of experts was further analyzed by comparing the "top 20" variables as rated by each group. Even though the correlations across groups were high, when all 228 variables in the survey were considered, the top-rated items were found to be somewhat different among groups.

Table 5 summarizes the responses of the panel of experts and the other eight groups using the same four categories included in the conceptual model (Wang, 1986) as used in framing Table 1. It is notable that the panel of experts, both categories of researchers, and state directors of special education put relatively high emphasis on variables relating to instruction. For special education researchers, 13 of their "top 20" items dealt directly with instruction. The comparable numbers were 10, 11, and 9 for the panel of experts, educational researchers/authors, and state directors of special education, respectively.

Special and regular education teachers rated a smaller number of variables relating to instruction as of highest importance. Instead, the teachers tended to put more emphasis on classroom management and climate variables than other groups did. Also, teachers tended to rate their own authority to make decisions as highly influential in learning. Researchers do not fully agree that variables reflecting authority for teachers in decisions about curriculum and instruction have been validated for importance in learning. Teachers also put high emphasis on characteristics of students, especially those relating to attitudes toward learning, as very important. State and local administrators tended to place more emphasis on support variables, such as family interest in education, than did teachers and researchers. All groups rated parent attitudes, expectations, and involvement in school affairs as very important.

DISCUSSION

This study has identified variables shown by research and judged by practitioners to be of high importance in establishing school learning environments. It may be concluded that these are among the dimensions of knowledge and instructional practice which deserve high attention in the initial preparation and continuing education of teachers. There is remarkable similarity among special and regular education teachers in judgments about what variables or principles of instruction are important. This suggests that much can be done in common in colleges and universities in the preparation of special and regular education teachers.

The variables identified as important for learning in the present study also may be viewed as a basis for studying individual students. This idea has not been widely explored, but appears to be sensible. For example, it might be observed that time-on-task tends to be low in a particular class or school. Perhaps a great deal of time is being given to management functions or to transitions between activities, at the expense of time devoted to instruction. In such a situation, plans and remedies can be implemented to improve the use of time in the classroom. But it may be equally important to observe individual differences among students in use of time and to identify those for whom increasing time-on-task needs most improvement. Most of the variables revealed in the study can be used in this dual way; that is, to study both situations and individual differences.

The approach to improvement of education growing from this study calls attention mainly to alterable variables and to the "level of the lesson"; that is, to the practical realities of teaching rather than to remote dispositional analysis. By the latter term we refer to testing for IQs, hypothesizing about "underlying process deficits", or other procedures for specifying remote dispositional states that some believe form the foundational aspects of special education. We believe that approach is a mistake and that, at least in the present state of knowledge about teaching, it is preferable to base instruction on factors directly observable and manageable in the learning environment.

We believe that much of special education would profit from rigorous efforts for improvement organized around variables identified as important for learning. Too often what has been claimed to be special has been quite ordinary. Haynes and Jenkins (1986), for example, have shown that students who go to resource rooms part-time for instruction often end up with no more total time on-task in subjects intended to have extra attention (e.g., reading) than if they had stayed fulltime in regular classes. Allington and McGill-Franzen (1989) report a similar finding. They observed students (all of them failing in reading) for an entire school day and found that students in special education actually received not only fewer minutes of reading instruction but less active teaching time and a higher proportion of "seat work" than pupils in regular classes. Important work remains to be done to clear out procedures that lack validity and increase adherence to principles and practices that have demonstrated worth in instruction.

The review of research and related surveys reported here help to sketch out the knowledge base on which special education of the future might be constructed. Because of the high consensus among educators, both special and regular, on variables that are important in arranging learning environments, it appears that much of the work near term should involve increased broad collaboration rather than separations of the kinds so common in the past.

NOTES

1. For a copy of the complete bibliography of materials reviewed and details of text citations, write to Prof. Margaret Wang, Center for Research in Human Development and Education, 933 Ritter Annex, Temple University, Philadelphia, PA 19122.

2. The 12-member panel included: Jere Brophy, Katherine Butler, Donald Clark, Joyce Epstein, Barbara Keogh, Jeffrey Osowski, Daniel Reschly, Judy Smith-Davis, Tom Skrtic, Carolyn Trice, James Ysseldyke, and Martha Ziegler.

Table 1

Twenty Variables Most Highly Rated by 12-Member Panel of Experts as Important for the Learning of Children: Represented in Four Categories

Categories*	Variables
Instruction	Time on task (student time engaged actively in learning)
	Time spent in direct instruction on basic skills in reading
	Time spent in direct instruction on basic skills in mathematics
	Providing frequent feedback to students about their performance
	Comprehension monitoring by the teacher (planning; monitoring effectivenes of actions; testing, revising, and evaluating learning strategies)
	Explicitly promoting student self-responsibility and effective metacognitive learning strategies
	Use of clear, organized, direct instruction
	Setting and maintaining clear expectations of content mastery
	Teacher reacts appropriately to correct and incorrect answers
	Task difficulty is appropriate (students are appropriately challenged)
Support System	Parental expression of affection to children
	Parental interest in student's school work
	Parental expectation for academic success
Student Characteristics	Use of self-regulation, metacognitive strategies
	Level of reading comprehension ability
	Attitude toward school
	Attitude toward teachers
	Motivation for continued learning
	Level of general academic knowledge
Classroom Management and Climate	Safe, orderly school climate

*these categories were taken from the conceptual model of variables that are important to learning (Wang, 1986)

Table 2

Additional Instructional Variables Rated as Important and Well-Confirmed by Research by the 12-Member Panel of Experts

Prescribing individualized instruction based on perceived match of type of learning tasks to student characteristics.

Use of procedures requiring rehearsal and elaboration of new concepts.

Systematic sequencing of instructional events and activities.

Explicit reliance on individualized educational plans (IEP) in planning day-to-day instruction for individual students.

Use of instruction to surface and confront student misconceptions.

Use of advance organizers, overviews, and reviews of objectives to structure information.

Clear signaling of transitions as the lesson progresses.

Significant redundancy in presentation of content.

Teacher conveys enthusiasm about content.

Using reinforcement contingencies.

Corrective feedback in event of student error.

Promoting learning through student collaboration (e.g., peer tutoring, cooperative group work).

Flexible grouping that enables students to work to improve and change status/groups.

Teaching for meaningful understanding.

Degree to which student inquiry is fostered.

Scaffolding and gradual transfer of responsibility from teacher to student.

Degree to which assessment is linked with instruction.

Skills taught within the context of meaningful application.

Good examples and analogies to concretize the abstract and familiarize the strange.

Explicitly promoting student self-monitoring of comprehension.

Table 3

Response Groups and Response Rates: Survey of Variables that Influence Learning

Groups	Number of Surveys Mailed	Number of Responses Rec'd.	Percent Rec'd.
Special Education Teachers	1001	449	45%
Regular Education Teachers	*	182	--
Principals	**	91	--
School Psychologists	526	207	39%
State Directors of Special Education	56	37	66%
State Directors of Chapter I Services	69	41	59%
Special Education Researchers	197	55	28%
Education Researchers/Authors	134	61	46%

*Distributed by respondents in the Special Education Teacher group

**Distributed by respondents in the School Psychologist group

Table 4

Pearson Correlations of Mean Ratings of 228 Variables by Eight Respondent Groups

Respondent Groups	ERA	SER	SPs	SPr	SDSE	SDCI	RET	SET
Educ. Researchers/Authors (ERA)	1.00							
Special Educ. Researchers (SER)	.91	1.00						
School Psychologists (SPs)	.88	.90	1.00					
School Principals (SPr)	.84	.86	.93	1.00				
St. Dtrs. of Special Educ. (SDSE)	.77	.87	.89	.87	1.00			
St. Dtrs. of Ch. I Programs (SDCI)	.81	.84	.92	.92	.88	1.00		
Regular Educ. Teachers (RET)	.80	.82	.92	.94	.82	.89	1.00	
Special Educ. Teachers (SET)	.78	.85	.95	.92	.88	.89	.95	1.00

Table 5

Twenty Most Important Variables that Were Rated as Highly Important by the Panel of Experts and Eight Professional Groups: Represented in Four Categories

Professional Groups	Categories of Variables*			
	Instruction	Support Systems	Student Characteristics	Classroom Management and Climate
12-Member Panel of Experts	10	3	6	1
Special Education Researchers	13	2	3	2
Educational Researchers/Authors	11	3	5	1
State Drs. of Special Education	9	6	3	2
State Drs. of Chapter I Programs	4	7	7	2
School Psychologists	3	5	8	4
School Principals	4	7	5	4
Special Education Teachers	4	3	8	5
Regular Education Teachers	2	4	6	8

*These categories were included in the model of variables that are important to learning

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DELIVERABLE 3-E

A Decision-Making Framework for Description of Innovative Education Programs

DELIVERABLE 3-E

A DECISION-MAKING FRAMEWORK FOR DESCRIPTION OF INNOVATIVE EDUCATION PROGRAMS

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Abstract

A programmatic decision-making framework, the consensus marker-outcome variable system (CMOVS), was developed as a result of a comprehensive "meta-review" and synthesis of research on variables considered by experts to be important to learning. The CMOVS systematically analyzes program design and implementation features, assesses them in relation to site-specific need, and provides a basis for calculating informational indexes. The information derived from the CMOVS can then be used to assist stakeholders in programmatic decision making.

A DECISION-MAKING FRAMEWORK
FOR DESCRIPTION
OF INNOVATIVE EDUCATION PROGRAMS

This paper discusses a decision-making framework concerning the design and implementation features of innovative educational practices/ programs. The framework, derived from the findings of a study designed to obtain a consensus on variables that are important to learning (Wang, Walberg, Reynolds, & Rosenfield, 1989), aims to provide a conceptual basis for systematic analysis, description and identification of features and implementation requirements of innovative educational programs for improving instruction and learning in regular classroom settings.

The first section provides an overview of the decision-making framework; the second section focuses on the research base for the design of the decision-making framework; and the final section provides sample illustrations of the use of the CMOVS as a conceptual guide for making programming decisions.

The Decision-Making Framework

The decision-making framework discussed in this paper, the Consensus Marker-Outcome Variable System (CMOVS), incorporates variables that are considered by professionals as important to learning, based on a recently completed research synthesis study (Wang, 1990). The CMOVS was developed with the goal of providing a common language that can be used by researchers to align concepts and methodologies across studies concerning variables that are important to learning. It also provides a synthesis of research findings that can be used by practitioners and policy makers to improve communication about programs, their features, and their implementation requirements for planning, documentation, and decision-making.

The impetus for the development of the decision-making framework arose out of two specific concerns about the current state of practice. The first is concern about the quality of education programs in terms of how they respond to increasing diversity among students. The second is concern about the need to develop a systematic information base on how to use what we know works to improve schools' capabilities to achieve the educational vision of providing equity in learning outcomes for all students, including those with special needs and/or those considered to be at risk of failing or dropping out of school.

Concern for Quality Education

The CMOVS was conceived within the context of rising public concern over the general quality of education, and in particular, the effectiveness of current educational approaches for students with special needs or otherwise considered educationally at risk -- those who require greater-than-usual educational and related service support. This concern for educational effectiveness has been expressed in a multitude of reports by a variety of commissions and study groups (e.g., Carnegie Forum on Education and the Economy, 1986; Committee for Economic Development, 1985; Council of Chief of State School Officers, 1987; Hawkins, 1986; National Coalition of Advocates for Students, 1985; National Governors' Association, 1986). There is a clear mandate to improve the school's ability to effectively and efficiently serve all students, including those who require special education or other remedial or compensatory programs, as well as those otherwise considered to be at risk of either failing or dropping out of school.

The Need to Build a Systematic Information Base

While there have been major efforts toward reform, current practices fall woefully short of this mandate. There is no lack of information on what to do to improve current practice (cf. Wittrock, 1986; Wang, Reynolds & Walberg, 1987-1989). However, there is a significant lack of systematic information on what we know works and how to use what we know to improve instruction and learning in schools.

Local schools face two demanding tasks: first, obtaining information on the design, implementation requirements, and efficacy of innovative approaches/practices; and second, evaluating the feasibility and the site-specific compatibility of the approaches with the objectives of a particular school district and/or school. Findings from a 1983 survey (Research for Better Schools) showed that local educators in New Jersey and Pennsylvania, for example, look to external training and technical assistance programs for staff development and support in three major areas: (a) curriculum and instruction, especially in terms of the implementation of innovative programs and practices, development and improvement of curricula, and in-service staff development for school personnel; (b) administration, including organizational planning, staffing and scheduling, facilities maintenance, and management skills, such as instructional leadership and communication; and (c) knowledge about the "outside world," including state and federal regulations and community relations.

Presently, there are few tools available to assist local schools/school districts in selecting approaches/practices for meeting their specific needs. This lack has resulted in a limited ability of school personnel to make informed decisions in selecting practices/programs, that is, how such decisions are aligned with local educational goals, resources, and needs. The CMOVS is intended to provide a systematic framework for guiding analysis of program design and implementation features in ways that can be helpful to school personnel and policy makers in developing, identifying, and selecting innovative practices/programs.

The Development of the Consensus Marker-Outcome Variable System

The variables included in the CMOVS are considered to be both important to learning and, perhaps more significant, "alterable" (educators have some chance of changing them in ways that enhance learning), thereby improving chances for students' learning success. In other words, variables included in the CMOVS are concerned with learning conditions that can bring about educational outcomes for students. Thus, in a real sense the consensus represented in the CMOVS is reflective of the recent shift from the study of "static" variables that are not easily alterable by schools (e.g., sex, age, SES, history of education) to the study of instruction and learning as they take place under specific environmental conditions.

Specifically, development of the CMOVS was based on the use of contemporary professional literature and expert opinions' to answer the following questions: What aspects of school and instruction enhance student learning? What kinds of social relationships are important to enhance student learning in regular classroom settings? What learner characteristics are important and alterable in improving learning of students with special needs?

In order to specify the well-confirmed knowledge about school learning, the development of the CMOVS began with a comprehensive meta-review and synthesis of research on variables considered to be important to learning. Then, various groups of educational professionals were asked to make judgments about the importance of the identified variables or principals in their work. Thus, the first step involved a detailed reading of the professional literature to make a "first approximation" list of important variables based on a conceptual framework of variables (Wang, 1986) that are important to learning in school contexts. Figure 1 shows a schematic representation of the conceptual framework.

Selection of a corpus of studies for analysis and synthesis

A vast research literature addresses one or more of the potential learning influences represented by the conceptual framework, and it clearly would not be possible to examine all of the thousands of original studies relevant to a synthesis of this scope. Indeed, even the literature of review articles is massive. For this reason we focused on authoritative reviews, handbook chapters (especially those sponsored by the American Educational Research Association and other organizations), selected additional syntheses in government documents and other sources.

A preliminary list of sources was reviewed by the Scientific Advisory Panel, and revised after their recommendations. Following this review, the sources chosen included chapters from the past decade or more of the Review of Research in Education, the Annual Review of Psychology, and the Annual

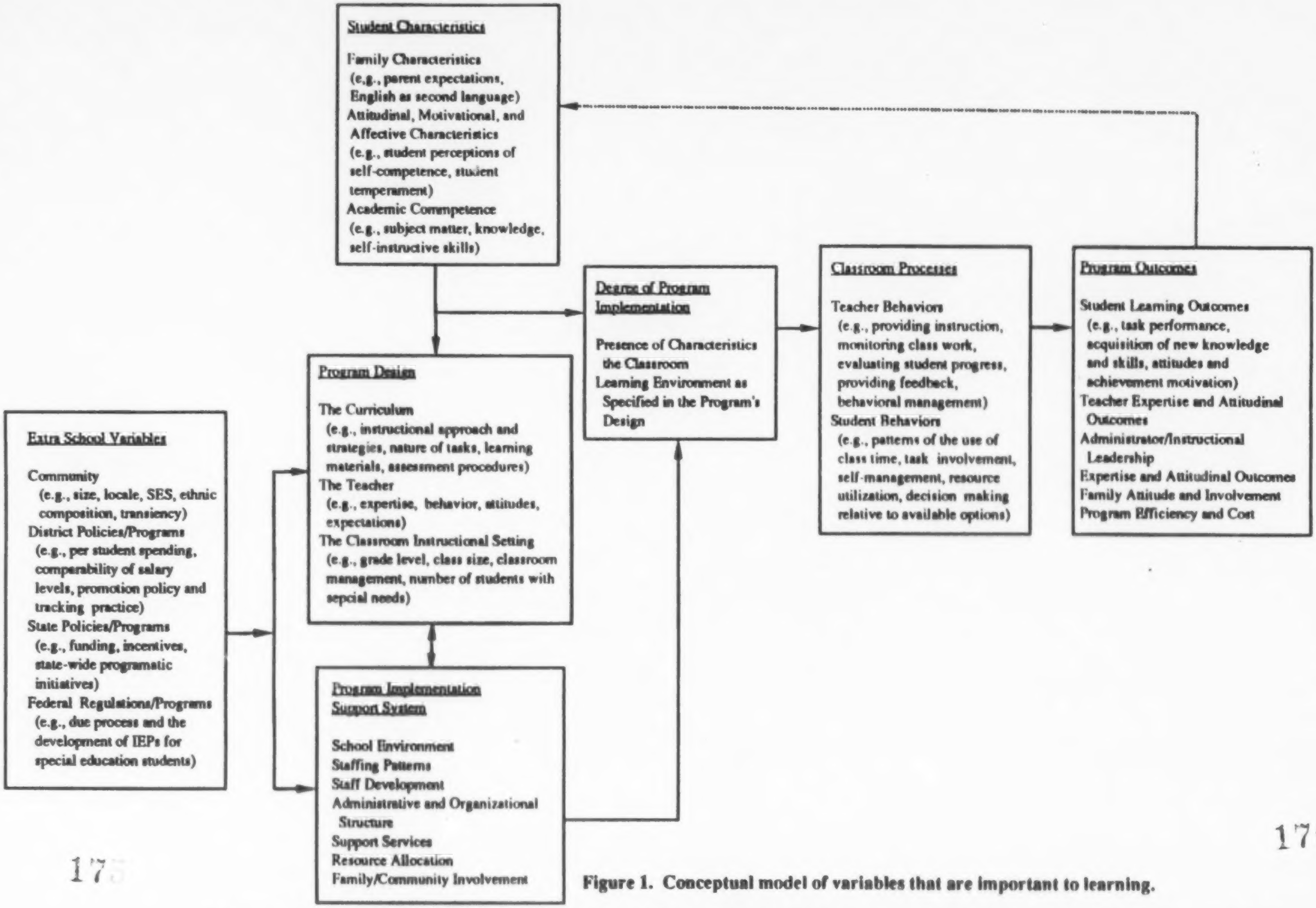
Student Characteristics
Family Characteristics
(e.g., parent expectations, English as second language)
Attitudinal, Motivational, and Affective Characteristics
(e.g., student perceptions of self-competence, student temperament)
Academic Commpetence
(e.g., subject matter, knowledge, self-instructive skills)
Degree of Program Implementation
Presence of Characteristics the Classroom
Learning Environment as Specified in the Program's Design
Classroom Processes
Teacher Behaviors
(e.g., providing instruction, monitoring class work, evaluating student progress, providing feedback, behavioral management)
Student Behaviors
(e.g., patterns of the use of class time, task involvement, self-management, resource utilization, decision making relative to available options)
Program Outcomes
Student Learning Outcomes
(e.g., task performance, acquisition of new knowledge and skills, attitudes and achievement motivation)
Teacher Expertise and Attitudinal Outcomes
Administrator/Instructional Leadership
Expertise and Attitudinal Outcomes
Family Attitude and Involvement
Program Efficiency and Cost
Extra School Variables
Community
(e.g., size, locale, SES, ethnic composition, transiency)
District Policies/Programs
(e.g., per student spending, comparability of salary levels, promotion policy and tracking practice)
State Policies/Programs
(e.g., funding, incentives, state-wide programatic initiatives)
Federal Regulations/Programs
(e.g., due process and the development of IEPs for special education students)
Program Design
The Curriculum
(e.g., instructional approach and strategies, nature of tasks, learning materials, assessment procedures)
The Teacher
(e.g., expertise, behavior, attitudes, expectations)
The Classroom Instructional Setting
(e.g., grade level, class size, classroom management, number of students with sepcial needs)
Program Implementation Support System
School Environment
Staffing Patterns
Staff Development
Administrative and Organizational Structure
Support Services
Resource Allocation
Family/Community Involvement

Figure 1. Conceptual model of variables that are important to learning.

Note: **Variables listed are intended to be illustrative only. They are not intended to reflect a comprehensive analysis for the purposes of the proposed work.

Review of Sociology, as well as the Handbook of Research on Teaching (Wittrock, 1986), Designs for Compensatory Education (Williams, Richmond & Mason, 1986), more specialized handbooks, and a small number of journal articles chosen to assure coverage of all the areas addressed in the comprehensive framework. Initially, over 200 articles, chapters, and other sources were identified. All of these sources were read, but some were excluded from the final corpus because they failed to address K-12 instruction in regular school settings, because they addressed exceptionally narrow and atypical learning outcomes, or because they were relevant only to rare or special-learner populations.

A total of 179 sources were included in the final corpus of studies (86 chapters from annual review series, 44 handbook chapters, 20 government and commissioned reports, 18 book chapters, and 11 review articles). All of these were relevant to a range of cognitive and/or affective learning outcomes for K-12 learners in formal educational settings. A list of more than 200 variables was assembled based on the literature reading. A detailed analysis of the literature is included in a paper on variables that are considered important to learning (Wang, Haertel, and Walberg, 1989).

In the next step, the Delphi survey technique was used to survey expert opinions about variables that are considered to be important to learning. A full report of the survey finding is in Wang, Reynolds, Walberg and Rosenfield, (1989). Briefly, a panel of 12 experts was identified for this phase of information gathering. The expert panel included leading researchers as well as outstanding practitioners and editors of professional journals. Using a scale from 1 (low) to 3 (high), the panel was asked to rate the importance of each of the variables in terms of demonstrated importance to student learning. They were also asked to add, delete, and suggest changes on the list of variables. In accordance with Delphi procedures, results of the "first round" of ratings were then sent back to the experts and they responded in a "second round," taking into account what other experts had said in the first round. Responses in both rounds formed the basis for revising the survey instrument, the survey of variables considered important to learning, which was then sent to a broad sample of professionals in order to form the data base for the development of the CMOVS.

Findings from a Survey of Consensus from the Field

To investigate questions about consensus among various educators on alterable variables considered important, eight groups of professionals were identified and asked to respond to the survey of variables considered important to learning. Through the cooperation of the Council for Exceptional Children (CEC) a random sample of 1001 teacher members of CEC was obtained; all are special educators. Of that sample, 449 (45%) responded to the survey. Each of the special education teachers was asked to recruit as an additional respondent the "regular" teacher whose classroom was nearest to his/her own classroom; 182 regular teachers responded.

In addition, a sample of 526 school psychologists was selected randomly from the membership list of the National Association of School Psychologists; 207 responded. Each psychologist was asked to recruit a school principal in a building they served. Fifty school principals responded. All state directors of special education and of Chapter I programs were asked to complete the survey, which they did at relatively high rates: 64% (N = 36) and 58% (N = 40), respectively. A group of special education researchers was identified by assembling names of recipients of federal research grants in the field of special education, specifically relating to services for mildly handicapped students in regular education settings; 55 of 197 responded. A final category of educational researchers/authors was created by assembling names of first authors of 134 major chapters in the professional literature used in the "meta-review" that initiated the development of the CMOVS; 61 (46%) responded.

To determine the extent of agreement among various groups of respondents to the survey on variables considered important to learning, Pearson correlations among the mean ratings of items as determined by the eight educator groups were examined. The results, summarized in Table 1, suggest a very high degree of consensus among such educator groups on variables that are important in attempting to enhance the learning of children in school. It may be noted, for example, that the correlation of mean ratings

Table 1

Pearson Correlations of Mean Ratings of 228 Variables by Eight Respondent Groups

Respondent Groups	ERA	SER	SPs	SPr	SDSE	SDCI	RET	SET
Educ. Researchers/Authors (ERA)	1.00							
Special Educ. Researchers (SER)	.91	1.00						
School Psychologists (SPs)	.88	.90	1.00					
School Principals (SPr)	.84	.86	.93	1.00				
St. Dtrs. of Special Educ. (SDSE)	.77	.87	.89	.87	1.00			
St. Dtrs. of Ch. I Programs (SDCI)	.81	.84	.92	.92	.88	1.00		
Regular Educ. Teachers (RET)	.80	.82	.92	.94	.82	.89	1.00	
Special Educ. Teachers (SET)	.78	.85	.95	.92	.88	.89	.95	1.00

by regular and special education teachers was .97. Though this was the highest correlation observed, all correlations tended to be high, with the median among 28 correlations being .88. The lowest correlation (.80) was between State Directors of Special Education and Education Researchers/ Authors. Judged by correlational analysis, there is remarkable similarity in the views of special and regular education teachers about principles to be considered in their teaching.

To further analyze the consensus among the eight educator groups, the mean ratings of the items that received the highest and lowest scores in each of the groups were examined. Even though the correlations across groups were high, when considering all 228 items in the survey, it was thought that the top-rated items might be somewhat different among groups. Table 2 displays items that received a mean rating of 2.7 or above, and Table 3 displays ratings below 1.9. Some contrasting patterns in the mean rating by groups are noted. It seems that there is more consensus among the groups on the lowest ranked items (see Table 3). However, some consistent patterns of differences were suggested in the data (see Table 2). For example, the patterns of ratings among principals, regular and special education teachers, and Chapter 1 directors were more similar when compared to those of the researchers. On the other hand, the ratings of special and regular education researchers and state directors of special education were even more alike.

Discussion of Study Findings

Although conclusions of consensus yield from a synthesis of the research base and the Survey of Consensus from the field, certain caveats should be noted. For example, it cannot be determined from the analyses of the literature what actual effect sizes will result; the analyses merely estimate their relative sizes. In addition, the analyses yield neither actual nor relative estimates of combinations of practices. It would seem reasonable to suppose that implementation of more practices with the highest estimates would yield the largest effects, but this supposition is a matter for subsequent empirical research.

Table 2
Patterns of Differences in Mean Ratings at or Above 2.7 Among Stakeholder Groups

Variables with Mean Ratings at or Above 2.7 by Total & Group	Mean Rating by Stakeholder Groups								
	TOTAL (1123)	RER (61)	SER (55)	PSY (207)	PRN (91)	SD (37)	C1D (41)	RET (182)	SET (449)
Out School Contextual Variables									
Home Environment & Parental Support									
parental involvement in assuring completion of homework	2.73				x		x	x	x
parental involvement in assuring attendance	2.85			x	x	x	x	x	x
parental application of discipline	2.77			x	x		x	x	x
parental interest in student's work	2.83	x	x	x	x	x	x	x	x
parental expectation for academic success	2.80	x	x	x	x		x	x	x
School Level Variables									
Teacher/Administrator Decision Making									
teacher involvement in instructional decision making	2.75		x	x	x		x	x	x
teacher involvement in increasing academic performance	2.79		x		x	x	x	x	x
School Culture (Ethos)									
safe, orderly school climate	2.75				x		x	x	x
Student Variables									
Social and Behavioral									
positive behavior	2.80			x	x			x	x
cooperativeness with teachers	2.71				x			x	x
Motivational and Affective									
attitude toward school	2.85			x	x		x	x	x
attitude toward teachers	2.77			x	x		x	x	x
motivation for continual learning	2.82		x	x	x	x	x	x	x
perseverance on learning tasks	2.76			x	x		x	x	x
self confidence	2.79		x	x	x	x	x	x	x
Cognitive									
level of reading comprehension ability	2.79	x	x	x	x	x	x	x	x
level of listening skills	2.76	x		x	x		x	x	x

Note:
RER - regular ed. researcher
SER - special ed. researcher
PSY - psychologist
PRN - principal
SD - state director
C1D - chapter 1 director
RET - regular ed. teacher
SET - special ed. teacher

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Table 2

(continued)

Variables with Mean Ratings at or Above 2.7 by Total & Group	Mean Rating by Stakeholder Groups								
	TOTAL (1123)	RER (61)	SER (55)	PSY (207)	PRN (91)	SD (37)	C1D (41)	RET (182)	SED (449)
Meta Cognitive Variables									
self-regulatory, self-control strategies	2.78			x	x			x	x
Implementation, Classroom Instruction, & Climate Variables									
Classroom Implementation Support									
establish efficient classroom routines and communication	2.70							x	x
Classroom Instruction									
use of clear instruction	2.73		x					x	x
teacher conveys enthusiasm	2.76			x	x			x	x
providing frequent feedback	2.81		x	x	x	x	x	x	x
teaching for understanding	2.77			x	x		x	x	x
good examples and analogies	2.71							x	x
Quantity of Instruction									
time on task	2.80	x	x	x	x	x	x	x	x
time on reading skills	2.70		x	x	x	x		x	x
Classroom Management									
teacher "withitness" (awareness)	2.75			x	x		x	x	x
Student and Teacher Interactions (social)									
teacher reacts appropriately	2.75			x	x		x	x	x
Classroom Climate									
task difficulty	2.74			x	x		x	x	x
low apathy	2.70			x	x			x	x
organization	2.80			x	x			x	x

Table 3
Patterns of Differences in Mean Ratings at or Below 1.9 Among Stakeholder Groups

Variables with Mean Ratings at or Below 1.9 by Total & Group	Mean Rating by Stakeholder Groups								
	TOTAL (1123)	RER (61)	SER (55)	PSY (207)	PRN (91)	SD (37)	C1D (41)	RET (182)	SET (449)
State and District Variables									
District Level Demographics									
school district size	1.83	x	x	x	x	x		x	
degree of school district centralization	1.83	x	x	x	x	x	x	x	x
contractual limits on after school meetings	1.55	x	x	x	x	x	x	x	x
contractual restrictions on aide activities	1.83	x	x	x	x	x	x		
efficiency of transportation system	1.73	x	x	x	x	x	x	x	
State Level Policy									
degree of state control of textbooks	1.74	x	x	x	x	x	x	x	x
School Level Variables									
School Level Demographics									
public vs. private school	1.73	x	x	x	x	x	x	x	x
level of title VII (bilingual) funding	1.89	x	x	x	x	x			
mix of student language backgrounds	1.87			x	x	x			x
Student Variables									
Student Level Demomographics									
	1.86	x	x	x		x	x		x
chronological age	1.41	x	x	x	x	x	x	x	x
gender	1.62	x	x	x	x	x	x	x	x
ethnicity									
Implementation, Classroom Instruction, & Climate Variables									
Quantity of Instruction									
time spent viewing educational TV	1.85	x	x	x	x	x	x		
Student and Teacher Interactions (academic)									
teacher asks questions low in difficulty	1.77	x	x	x	x	x	x	x	x
teacher asks questions low in cognitive level	1.71	x	x	x	x	x	x	x	x
Classroom Climate									
competition	1.82	x	x	x		x	x		x

Note: **RER** - regular ed. researcher	**SD** - state director
SER - special ed. researcher	**C1D** - chapter 1 director
PSY - psychologist	**RET** - regular ed. teacher
PRN - principal	**SET** - special ed. teacher

Another caveat applies to the content analysis of research literature on group-level effects, notably the literature on effective schools. Some of the effective schools factors have been analyzed in relation to school averages on achievement tests. Such relationships might be found somewhat larger or smaller if calculated for individual children. It can be expected that expert reviewers on this subject (on which the syntheses depend) would take this uncertainty into consideration in interpreting their findings. It has rarely been demonstrated that techniques that work for the average student have deleterious consequences for other students' learning. Nonetheless, it is worth keeping this limitation in mind in interpreting the findings and in tracing their implications.

There are many other cautions that ordinarily apply to educational research, such as the possibility that effective methods found a decade ago no longer apply today. These are obvious enough to leave to researchers and experienced educators as they think about how the findings apply in their own situations. While cognizant of the limitations of the CMOVS data base, several practical applications can be envisioned.

The following section provides an example of how the CMOVS can be used as a guiding framework to improve schools' programs.

The Application of the CMOVS

Implications of the use of the CMOVS' to enhance communication among researchers and practitioners who make programmatic decisions and align studies on variables that are important to learning are manifold. One such application is the CMOVS' provision of a "marker" system for describing program design and implementation features (effective practices) for schools aiming to improve student learning outcomes.

As discussed in the previous section on the research base of the CMOVS, a total of 228 variables considered to be important to learning were culled from the research literature and based on consensus from the field. The variables were grouped under six major marker categories: a) state and district variables; b) out-of-school contextual variables; c) school-level variables; d) student variables; e) program design variables; and f) implementation, classroom instruction, and climate variables. Further delineations of the six categories of marker variables resulted in 30 sub-categories. The sub-categories under each of the major categories are listed in column 1 of Table 4. For example, two sub-categories of marker variables were identified under the category of state and district variables. They are: district-level demographics and state-level policy variables. Similarly, the category of out-of-school contextual variables consists of four marker variables: community, peer group, home environment and parental support, and student use of out-of-school time variables.

The 30 sub-categories of the CMOVS can be used as a guideline for school improvement in a variety of ways. Table 5 provides an illustration of how the CMOVS can be useful to program developers, implementors, and policy makers for making informed decisions on selection of innovative practices/programs. The procedure involves systematically analyzing features of specific educational approaches/practices and assessing them in relation to needs of local schools.

Column 1 of Table 4 shows a list of 30 categories of variables that are important to learning included in the CMOVS and the anticipated outcomes of the restructured program desired by a particular user. The second column shows the specific weightings of each variable category based on the consensus from the field (Wang, Walberg, Reynolds, and Rosenfield, 1989). The "X"s listed in each program column indicate that particular variables were considered in the design of a specific approach or practice being reviewed by a user.

For example, Program B is a program designed using a teacher collaboration approach. Variables that were explicitly considered in the design of Program B under the category of State and District Variables include district level demographics variables and state level policy variables. Under the category of School Level Variables, teacher/administrator decision-making variables, school culture variables, and school-wide policy and organizational

Table 4. Decision Making Framework: A Preliminary Analysis of the Programmatic Emphases of Selected Programs

Marker Variable Categories	VARIABLE WEIGHTING Based on Consensus from the Field*	Program A A Peer Collaboration Approach	Program B A Teacher Collaboration Approach	Program C A Restructured Classroom Approach	Program D A Curriculum Modification	Program E A Comprehensive, Integrated,Education and Related Service Delivery Approach
I. VARIABLES CONSIDERED IMPORTANT TO LEARNING						
A. State and District Variables						
1. District Level Demographics Variables	(2)		x	x		x
2. State Level Policy Variables	(2)		x			x
B. Out of School Contextual Variables						
1. Community Variables	(2)					x
2. Peer Group Variables	(2)	x				x
3. Home Environment and Parental Support Variables	(3)				x	x
4. Student Use of Out of School Time Variables	(2)	x		x		x
C. School Level Variables						
1. Demographic Variables	(1)					x
2. Teacher/Administrator Decision Making Variables	(3)		x	x		x
3. School Culture Variables (Ethos Conducive to Teaching and Learning)	(3)	x	x	x		x
4. School-Wide Policy and Organizational Variables	(2)		x	x		x
5. Accessibility Variables	(2)			x		x
6. Parental Involvement Policy Variables	(2)					x
D. Student Variables						
1. Demographic Variables	(1)			x		x
2. History of Educational Placements	(2)			x	x	x
3. Social and Behavioral Variables	(3)	x		x	x	x
4. Motivational and Affective Variables	(3)	x	x	x	x	x
5. Cognitive Variables	(2)	x	x	x	x	x
6. Metacognitive Variables	(3)	x	x	x	x	x
7. Psychomotor Variables	(2)	x	x	x	x	x
E. Program Design Variables						
1. Demographic Variables	(2)			x		x
2. Curriculum and Instructional Variables	(2)	x	x	x		x
3. Curriculum Design Variables	(2)	x		x		x
F. Implementation, Classroom Instruction, and Climate Variables						
1. Classroom Implementation Support Variables	(2)			x		x
2. Classroom Instructional Variables	(3)	x	x	x	x	x
3. Quantity of Instruction Variables	(2)			x	x	x
4. Classroom Assessment Variables	(2)			x	x	x
5. Classroom Management Variables	(3)	x		x		x
6. Student and Teacher Interactions: Social Variables	(3)	x		x		x
7. Student and Teacher Interactions: Academic Variables	(2)	x		x		x
8. Classroom Climate Variables	(3)	x		x		x
II. EXPECTED PROGRAM OUTCOMES						
A. Student Learning Outcomes		x	x	x	x	x
B. Teacher Expertise and Attitudes		x	x	x	x	x
C. Administrator/Instructional Leader Expertise and Attitudes			x	x		x
D. Family Expectation-Attitudes						x
E. Program Cost Effectiveness		x	x	x	x	x

* Abstracted from Wang, Walberg, Reynolds and Rosenfield (1989), "Variables Important to Learning: A Consensus From the Field," Temple University Center for Research in Human Development and Education.

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Table 5. An Illustration of Using the Decision-Making Framework to Calculate Effectiveness Index

Marker Variable Categories	VARIABLE WEIGHTING Based on Consensus from the Field*	IMPORTANCE RATING by the potential user	Program A A Peer Collaboration Approach		Program B A Teacher Collaboration Approach	
			Variables emphasized in program design	EFFECTIVENESS** RATING	Variables emphasized in program design	EFFECTIVENESS* RATING
I. VARIABLES CONSIDERED IMPORTANT TO LEARNING						
A. State and District Variables						
1. District Level Demographics Variables	(2)	1	0	0	x	2
2. State Level Policy Variables	(2)	2	0	0	x	4
B. Out of School Contextual Variables						
1. Community Variables	(2)	1		0	0	0
2. Peer Group Variables	(2)	2	x	4	0	0
3. Home Environment and Parental Support Variables	(3)	3		0	0	0
4. Student Use of Out of School Time Variables	(2)	1	x	2	0	0
C. School Level Variables						
1. Demographic Variables	(1)	2	0	0	0	0
2. Teacher/Administrator Decision Making Variables	(3)	3	0	0	x	9
3. School Culture Variables (Ethos Conducive to Teaching and Learning)	(3)	3	0	0	x	0
4. School-Wide Policy and Organizational Variables	(2)	3	x	6	x	6
5. Accessibility Variables	(2)	3	0	0	0	6
6. Parental Involvement Policy Variables	(2)	3	0	0	0	0
D. Student Variables						
1. Demographic Variables	(1)	1	0	0	0	0
2. History of Educational Placements	(2)	1	0	0	0	0
3. Social and Behavioral Variables	(3)	3	x	9	0	0
4. Motivational and Affective Variables	(2)	2	x	4	x	4
5. Cognitive Variables	(3)	1	x	3	x	3
6. Metacognitive Variables	(3)	1	x	3	x	3
7. Psychomotor Variables	(2)	1	x	2	x	2
E. Program Design Variables						
1. Demographic Variables	(2)	2	0	0	0	0
2. Curriculum and Instructional Variables	(2)	2	x	4	x	4
3. Curriculum Design Variables	(2)	2	x	4	0	0
F. Implementation, Classroom Instruction, and Climate Variables						
1. Classroom Implementation Support Variables	(2)	3	0	0	0	0
2. Classroom Instructional Variables	(3)	3	x	9	x	0
3. Quantity of Instruction Variables	(2)	3	0	0	0	6
4. Classroom Assessment Variables	(2)	3	0	0	0	0
5. Classroom Management Variables	(3)	3	x	9	0	0
6. Student and Teacher Interactions: Social Variables	(3)	3	x	9	0	0
7. Student and Teacher Interactions: Academic Variables	(2)	3	x	6	0	0
8. Classroom Climate Variables	(3)	3	x	9	0	0
II. EXPECTED PROGRAM OUTCOMES						
A. Student Learning Outcomes		3	x	3	x	3
B. Teacher Expertise and Attitudes		3	x	3	x	3
C. Administrator/Instructional Leader Expertise and Attitudes		2	0	0	x	0
D. Family Expectation - Attitudes		2	0	0	0	0
E. Program Cost Effectiveness		2	x	2	x	2
Program Effectiveness Index		79		91		57

Note: *Importance rating scale: 3 (high importance); 2 (moderate importance); 1 (low importance)
Effectiveness Rating: **Variable Weighting x Importance Rating for variables emphasized in a given program

variables were considered important; but demographic variables, accessibility variables, and parental involvement policy variables were not emphasized in the design of Program B.

Based on the variables considered important (shown in Table 4), several simple quantitative indexes can be generated as a basis for making program design decisions. For example, these indexes can be used to develop an information base for identifying program development needs and/or selecting a particular approach or practice for adoption or adaptation in order to meet the improvement needs of a particular school. Examples of the variety of indices that can be generated for consideration in making programming decisions are presented below.

Program Effectiveness Index

Using the variable weightings based on the consensus from the field (shown in column 2 of Table 5), plus the information on design features emphasized in the various programs as indicated by "X"s in Table 5, potential users can develop an effectiveness index that reflects site-specific needs as they make selection judgments on given approaches or practices.

Calculating the Program Effectiveness Index. The first step in developing a Program Effectiveness Index is to calculate the importance rating by the user (potential adopter of the program/approach). This is done by asking the user to rate the importance of the variable categories listed in Column 1 of Table 5, using a three-point scale. A rating of "3" indicates that a particular variable category is considered of high importance in terms of the user's site-specific needs; a rating of "2" indicates that a particular variable category is of moderate importance; and a rating of "1" indicates that a particular variable category is of low importance. Users' ratings may be based on a variety of user-specific information (e.g., their own experiences, current programs implemented in their respective schools, knowledge of a particular set of research findings, philosophical alliances or differences on a specific instructional approach, and the importance of the variables from their own site-specific perspectives). The quantitative index derived from the potential users' importance ratings will enable them to make decisions on the extent to which the various educational approaches and program specific practices of the various extant programs being considered meet the program improvement and implementation support needs of their respective schools/school districts.

Table 5 provides an example of how a hypothetical user can apply the CMOVS for calculating a Program /Effectiveness Index. The second column of Table 5 shows the Variable Weighting Scores (based on the three-point scale) of each of the variable categories included in the CMOVS. These scores are the result of consensus ratings from the field (Wang, Reynolds, Walberg & Rosenfield, 1989). The hypothetical user's importance rating of each of the variables included in the CMOVS are listed in Column 3 of Table 5. The number listed in the last row of column 3 is "79," the total possible Importance Score (the users' judgments on the importance or relevance of the CMOVS variables to the educational goals and/or program improvement needs of their specific schools/school districts).

As an illustration, columns 5 and 7 show the program effectiveness ratings for Program A and Program B respectively. For example, the particular hypothetical user was interested in adopting either Program A, which uses the peer collaboration approach, or Program B, which uses a teacher collaboration approach. The hypothetical user calculated Program Effectiveness Indexes for Program A and Program B based on the ratings of variable categories considered important for meeting her/his program improvement and/or implementation support needs. As shown in the last row of column 5, the program's overall Effectiveness Index for meeting the site-specific improvement needs for Program A is "91." This score is the sum of the user's Importance Ratings for each of the variable categories emphasized in the design of Program A (indicated by an "X") multiplied by the corresponding Variable Weighting Scores based on the consensus from the field (column 2). For example, the "Program Effectiveness Index" for variable category B.2 (Peer Group Variables) of Program A equals "4." The Program Effectiveness Index for variable category B.2 is derived by multiplying a Variable Weighting of "2" x an Importance Rating of "2" x "1" (the fact that this variable is emphasized in the design of Program A as indicated by an "X").

Thus, based on the overall Effectiveness Scores, as shown in Table 3, without considering other factors, Program A (with a score of "91") seems to match the particular hypothetical user's program improvement needs better than Program B (with a score of "57").

Desirability of Implementation Index

Another way of using the CMOVS for making program design decisions is to calculate a Desirability of Implementation Index for the approaches/practices being considered. Some variables may be relatively easy to incorporate in the on-going program at a given school for various reasons, (e.g., because the approach or practice being considered has already been incorporated into their programs, the staff can be quickly trained to implement the variables on a systematic basis). Other variables, however, may require extensive training, special materials, and modifications of the overall school program. Thus, the implementation of a given program or a component of a program may require special techniques or implementation support not as easily or feasibly integrated into the ongoing programs. Therefore, implementation may not be as "desirable" for a given user's specific situation. The Desirability of Implementation Index is calculated according to the user's judgement on the feasibility of implementing the program in his or her school. This is determined by using the Feasibility of Implementation Rating and the Variable Weighting based on the consensus from the field.

Calculating the Feasibility of Implementation Rating. The purpose of calculating the Feasibility of Implementation Index is to quantify the extent to which implementation of a selected approach/practice is feasible. The weighting method used in the development of the Program Effectiveness Index discussed above can also be used in calculating the feasibility of implementing an approach/practice and/or a particular component of a program. Based on a three-point scale, users first determine a Feasibility of Implementation (instead of importance) Rating by assigning a value to each variable category included in the CMOVS. A rating of "3" is given to a variable category that could be easily implemented based on the user's judgement; a rating of "2" is given to a variable category that could be moderately implemented; and a rating of "1" is given to a variable category that could prove difficult to implement. The Feasibility of Implementation Rating Scores for each of the variable categories are listed in column 3 of Table 6.

Calculating the Desirability of Implementation Index. Once the Feasibility of Implementation Rating Scores have been calculated, they may be used to calculate the Desirability of Implementation Index for a given program. To obtain a Desirability of Implementation Index (see columns 5 and 7 of Table 6), the Feasibility of Implementation Rating for each variable considered in the design of a particular program (indicated by an "X") is multiplied by its corresponding Variable Weighting Score based on consensus from the field (column 2). By adding the Desirability of Implementation Ratings for each of the variable categories considered, the user is able to derive an overall Desirability of Implementation Score for each given program (see the last row of columns 5 and 7 in Table 6). This index essentially reflects both the consensus from the experts on variables that are important to learning and the particular program's "desirability" for implementation based on the users' best judgments of feasibility in the context of site-specific circumstances. According to Table 6, Program A, which has a Desirability Score of 101, is probably a more feasible program for the user's purposes as compared to Program B, which has a Desirability Score of 58.

Conclusion

There are multiple ways to handle the mathematics for calculation of the various indexes. Users may design other indexes to meet their own needs. The necessary evaluation can be done by hand or by using a computer program with a built-in weighting index. Depending on the intended purpose, the user determines which index to use and how to apply the information derived from the various indexes. Appendix B includes a diagram of the schematic process for the computer analysis program, a sample of the computerized interactive decision-making program, and the results of the computer analysis of the user's ratings of a given approach/practice being considered. The printout shows a suggested list of candidate approaches/practices that include features

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Table 6. An Illustration of Using the Decision-Making Framework to Calculate Desirability of Implementation Index

Marker Variable Categories	VARIABLE WEIGHTING- Based on Consensus from the Field*	Feasibility of Implementation Rating	Program A A Peer Collaboration Approach		Program B A Teacher Collaboration Approach	
			Variables emphasized in program design	DESIRABILITY** RATING	Variables emphasized in program design	DESIRABILITY* RATING
I. VARIABLES CONSIDERED IMPORTANT TO LEARNING						
A. State and District Variables						
1. District Level Demographics Variables	(2)	1	0	0	x	2
2. State Level Policy Variables	(2)	3	0	0	x	6
B. Out of School Contextual Variables						
1. Community Variables	(2)	2	0	0	0	0
2. Peer Group Variables	(2)	3	x	6	0	0
3. Home Environment and Parental Support Variables	(3)	1	0	0	0	0
4. Student Use of Out of School Time Variables	(2)	2	x	4	0	0
C. School Level Variables						
1. Demographic Variables	(1)	1	0	0	0	0
2. Teacher/Administrator Decision Making Variables	(3)	3	0	0	x	9
3. School Culture Variables (Ethos Conducive to Teaching and Learning)	(3)	2	0	0	x	0
4. School-Wide Policy and Organizational Variables	(2)	1	x	2	x	2
5. Accessibility Variables	(2)	3	0	0	0	6
6. Parental Involvement Policy Variables	(2)	2	0	0	0	0
D. Student Variables						
1. Demographic Variables	(1)	2	0	0	0	0
2. History of Educational Placements	(2)	1	0	0	0	0
3. Social and Behavioral Variables	(3)	2	x	6	0	0
4. Motivational and Affective Variables	(2)	3	x	6	x	6
5. Cognitive Variables	(3)	1	x	3	x	3
6. Metacognitive Variables	(3)	2	x	6	x	6
7. Psychomotor Variables	(2)	3	x	6		0
E. Program Design Variables						
1. Demographic Variables	(2)	1	0	0	0	0
2. Curriculum and Instructional Variables	(2)	2	x	4	x	4
3. Curriculum Design Variables	(2)	3	x	6	0	0
F. Implementation, Classroom Instruction, and Climate Variables						
1. Classroom Implementation Support Variables	(2)	2	0	0	0	0
2. Classroom Instructional Variables	(3)	3	x	9	x	0
3. Quantity of Instruction Variables	(2)	3	x	6	0	6
4. Classroom Assessment Variables	(2)	2	0	0	0	0
5. Classroom Management Variables	(3)	3	x	9	0	0
6. Student and Teacher Interactions: Social Variables	(3)	2	x	6	0	0
7. Student and Teacher Interactions: Academic Variables	(2)	3	x	6	0	0
8. Classroom Climate Variables	(3)	3	x	9	0	0
II. EXPECTED PROGRAM OUTCOMES						
A. Student Learning Outcomes		3	x	3	x	3
B. Teacher Expertise and Attitudes		2	x	2	x	2
C. Administrator/Instructional Leader Expertise and Attitudes		2	0	0	x	2
D. Family Expectation - Attitudes		1	0	0	0	0
E. Program Cost Effectiveness		2	x	2	x	2
Desirability Index				101		58

Note: *Implementation rating scale: 3 (high importance); 2 (moderate importance); 1 (low importance)
**Stakeholder Rating: Variable Weighting x Importance Rating for variables emphasized in a given program

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that are most responsive to variables considered important to learning.

The use of the CMOVS as a decision-making framework for developing a site-specific program effectiveness and feasibility data base has several virtues. Using a quantification methodology to derive a data base for decision-making will allow the user to have multiple information resources that are systematic and specific to their information needs. Users may adopt the average ratings as calculated, or develop their own weighting schemes. They can combine this information with their best judgment of their own situations and the characteristics of the students they serve.

Although the foregoing discussion emphasizes the use of the framework by potential consumers of educational programs, it may also prove useful to curriculum designers and developers of innovative programs. The list of variables included in the CMOVS can serve as a checklist to determine which variables are critical to consider in program development and evaluation efforts. The checklist ensures that the program design incorporates features that research suggests are important to enhance learning efficiency and productivity. Thus, from the outset, consideration can be given to the variety of ways in which approaches or practices can be implemented.

If all programmatic factors were equal, it could be anticipated that the fully implemented programs which include more significant variables (features) would improve learning the most. In actual practice, however, all the factors involved are unlikely to be equal. Programs with extensive features are likely to be more costly to implement and manage. Therefore, both program developers and users need to carefully analyze the site-specific constraints and needs and weigh the trade-offs between cost and effectiveness in identifying priorities and in making programmatic decisions.

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APPENDIX A

Master List of Variables, Definitions and Consensus from the Field

Variables Important To Learning: A Consensus From the Field

Variables	Number of Variables in Each Variable Category	Number of Effective Practices (rated as important) in Each Variable Category
CATEGORY I: State and District Variables		
A. District Level Demographics and Marker Variables	(10)	3
B. State Level Policy Variables	(6)	3
CATEGORY II: Out of School Contextual Variables		
A. Community Variables	(3)	3
B. Peer Group Variables	(5)	5
C. Home Environment and Parental Support Variables	(9)	9
D. Student Use of Out of School Time Variables	(5)	3
CATEGORY III: School Level Variables		
A. Demographic and Marker Variables	(8)	3
B. Teacher/Administrator Decision Making Variables	(6)	6
C. School Culture Variables (Ethos Conducive to Teaching and Learning)	(8)	8
D. School-Wide Policy and Organizational Variables	(13)	11
E. Accessibility Variables	(1)	1
F. Parental Involvement Policy Variables	(2)	2
CATEGORY IV: Student Variables		
A. Demographic and Marker Variables	(7)	4
B. History of Educational Placements	(3)	3
C. Social and Behavioral Variables	(5)	5
D. Motivational and Affective Variables	(9)	9
E. Cognitive Variables	(12)	12
F. Metacognitive Variables	(4)	4
G. Psychomotor Variables	(1)	1
CATEGORY V: Program Design Variables		
A. Demographic and Marker Variables	(4)	4
B. Curriculum and Instructional Variables	(15)	15
C. Curriculum Design Variables	(13)	13
CATEGORY VI: Implementation, Classroom Instruction and Climate Variables		
A. Classroom Implementation Support Variables	(6)	4
B. Classroom Instructional Variables	(26)	26
C. Quantity of Instruction Variables	(12)	11
D. Classroom Assessment Variables	(4)	4
E. Classroom Management Variables	(5)	5
F. Student and Teacher Interactions: Social Variables	(6)	6
G. Student and Teacher Interactions: Academic Variables	(5)	5
H. Classroom Climate Variables	(15)	15

A Summary of Findings from
A Survey of Consensus from the Field

Category I. State and District Variables:

These are variables associated with state and district level school governance and administration. They include state curriculum and textbook policies, testing and graduation requirements, and teacher licensure; as well as specific provisions in teacher contracts, and some district-level administrative and fiscal variables.

		Variables	Consensus Rating
I-A.		**District Level Demographics and Marker Variables**	
	2.	School district size	
	3.	Degree of school district bureaucratization	
	4.	Degree of school district centralization	
	5.	Presence of contractual limits on after-school meetings	
	6.	Limits on class size	
	7.	Presence of contractual restrictions on activities performed by aides	
	8.	Degree of central office assistance and support for programs	*
	9.	Degree of board of education support for instructional programs	*
		Per pupil expenditure	*
		Efficiency of transportation system	
I-B.		**State Level Policy Variables**	
	1.		
	2.	Teacher licensure requirements	*
	3.	Degree of state control over textbooks	
	4.	Degree of state control over curriculum	
	5.	Academic course and unit requirements	*
	6.	Minimum competency test requirements	
		Adherence to least restrictive environment/mainstreaming	*

Note: ** = highly important (mean rating of 2.6 and above, based on a 3-point scale)
* = moderately important (mean rating of 2.0 - 2.5, based on a 3-point scale)

Variables	Consensus Rating
Category II. Out of School Contextual Variables:	
These are variables associated with the home and community contexts within which schools function. They include community demographics, peer culture, parental support and involvement, and amount of time students spend out-of-school on such activities as television viewing, leisure reading, and homework.	
II-A. Community Variables	
1. Socioeconomic level of community	**
2. Ethnic mix of community	*
3. Quality of social services for students	*
II-B. Peer Group Variables	
1. Level of peers' academic aspirations	**
2. Level of peers' occupational aspirations	**
3. Presence of well defined clique structure	*
4. Degree of peers' substance abuse	**
5. Degree of peers' criminal activity	**
II-C. Home Environment and Parental Support Variables	
1. Educational environment (e.g., number of books and magazines at home)	**
2. Parental involvement in assuring completion of homework	**
3. Parental involvement in assuring regular school attendance	**
4. Parental monitoring of student television viewing	**
5. Parental participation in school conferences and related activities	*
6. Parental application of appropriate, consistent discipline	**
7. Parental expression of attention to children	**
8. Parental interest in student's school work	**
9. Parental expectation for academic success	**
II-D. Student Use of Out of School Time Variables	
1. Student participation in clubs and extracurricular school activities	
2. Amount of time spent on homework	*
3. Amount of time spent on leisure reading	*
4. Amount of time spent viewing educational television	
5. Amount of time spent viewing noneducational television	*

Variables	Consensus Rating
Category III. School Level Variables:	
These are variables associated with school-level demographics, culture, climate, policies, and practices. They include demographics of the student body, whether the school is public or private, levels of funding for specific categorical programs, school-level decision making variables, and specific school-level policies and practices, including policies on parental involvement in the school.	
III-A. Demographic and Marker Variables	
1. Public versus private school	
2. Size of school	
3. Level of Chapter I (compensatory education) funding	*
4. Level of Title VII (bilingual) funding	
5. Level of PL 94-142 (handicapped) funding	*
6. Mix of socioeconomic levels in the school	*
7. Mix of cultural/ethnic groups in the school	
8. Mix of student language backgrounds in the school	
III-B. Teacher/Administrator Decision Making Variables	
1. Teacher and administrator consensus on school values, norms, and roles	**
2. Principal actively concerned with instructional program	**
3. Teacher involvement in curricular decision making	**
4. Teacher involvement in instructional decision making	**
5. Teacher involvement in resource allocation decisions	*
6. Teacher involvement in finding ways to increase academic performance	**
III-C. School Culture Variables (Ethos Conducive to Teaching and Learning)	
1. Use of cooperative, not exclusively competitive, goal structures	*
2. School-wide emphasis on and recognition of academic achievement	**
3. Low staff absenteeism	*
4. Low staff turnover	*
5. Low staff alienation	**
6. Active collaboration between regular classroom teachers and special education teachers	**
7. Safe, orderly school climate	**
8. Degree of school personnel professional collaboration	**

Variables	Consensus Rating
Category III. School Level Variables: (continued)	
III-D. School-Wide Policy and Organizational Variables	
1. Presence of "effective schools program"	*
2. Explicit school grading and academic progress policies	*
3. Explicit school-wide discipline policy	*
4. Explicit school-wide attendance policy	*
5. Coordination of pullout programs for handicapped students with regular instructional programs	*
6. Use of multi-age grouping	
7. Use of instructional teaming	*
8. Use of cross-age tutoring	*
9. Use of peer tutoring	*
10. Use of academic tracking for specific school subject areas	*
11. Minimization of external classroom disruptions (e.g., broadcast announcements)	
12. Adherence to least restrictive environment/mainstreaming	*
13. Minimum use of suspension and expulsion as discipline tools	*
III-E. Accessibility Variables	
1. Accessibility of educational program (overcoming architectural, communication, and environmental barriers	*
III-F. Parental Involvement Policy Variables	
1. Parental involvement in improvement and operation of instructional programs	*
2. School-sponsored parenting skills workshops (e.g., behavior modification, parent effectiveness training)	*

Variables	Consensus Rating
Category IV. Student Variables:	
These are variables associated with individual students themselves, including demographics, academic history, and a variety of social, behavioral, motivational, cognitive, and affective characteristics.	
IV-A. Demographic and Marker Variables	
1. Chronological age	
2. Socioeconomic status	*
3. Gender	
4. Ethnicity	
5. First or native language	*
6. Physical and health status	*
7. Special education classifications (e.g., EMR, LD)	*
IV-B. History of Educational Placements	
1. Prior grade retentions	*
2. Prior special placements	*
3. Current placement in regular class versus self-contained special education class	*
IV-C. Social and Behavorial Variables	
1. Positive, nondisruptive behavior	**
2. Appropriate activity level	**
3. Cooperativeness with teacher	**
4. Cooperativeness with peers	**
5. Ability to make friends with peers	*
IV-D. Motivational and Affective Variables	
1. Attitude toward school	**
2. Attitude toward teachers	**
3. Attitude toward subject matter instructed	**
4. Motivation for continual learning	**
5. Independence as a learner	**
6. Perseverance on learning tasks	**
7. Self-confidence	**
8. Academic self-competence concept in subject area instructed	**
9. Attributions for success and failure in subject area instructed	**

Variables	Consensus Rating
Category IV. Student Variables: (continued)	
IV-E. Cognitive Variables	
1. Piagetian stage of cognitive development	*
2. Level of reasoning (fluid ability)	**
3. Level of spatial ability	*
4. Memory	**
5. Level of general academic (crystallized) knowledge	**
6. Level of specific academic knowledge in subject area instructed	*
7. Level of reading comprehension ability	**
8. Level of writing ability	*
9. Level of computational ability	*
10. Level of oral fluency	*
11. Level of listening skills	**
12. Learning styles (e.g., field independent, visual/auditory learners, high cognitive complexity)	*
IV-F. Metacognitive Variables	
1. Self-regulatory, self-control strategies (e.g., control of attention)	**
2. Comprehension monitoring (planning: monitoring effectiveness of attempted actions; monitoring outcomes of actions; testing, revising, and evaluating learning strategies)	**
3. Positive strategies for coping with failure	**
4. Positive strategies to facilitate generalization of concepts	**
IV-G. Psychomotor Variables	
1. Psychomotor skills specific to area instructed	*

Variables	Consensus Rating
Category V. Program Design Variables:	
These are variables associated with instruction as designed, and with the physical arrangements for its delivery. They include the instructional strategies specified by the curriculum, and characteristics of instructional materials.	
V-A. Demographic and Marker Variables	
1. Size of instructional group (whole class, small group, one-on-one instruction)	**
2. Proportion of students with special needs served in regular classes	*
3. Number of classroom aides required	*
4. Resources needed	*
V-B. Curriculum and Instructional Variables	
1. Clearly presented academic, social, and attitudinal program goals/outcomes	**
2. Use of explicit goal/objective setting for instruction of individual student (e.g., Individualized Educational Plans (IEPs)	*
3. Use of mastery learning techniques, including use of instructional cues, engagement, and corrective feedback	**
4. Use of cooperative learning strategies	*
5. Use of personalized instructional program	*
6. Use of prescriptive instruction combined with aspects of informal or open education	*
7. Use of diagnostic-prescriptive methods	*
8. Use of computer-assisted instruction	*
9. Use of crisis management techniques to control classroom disruptiveness	*
10. Use of program strategies for favorable affective climate	*
11. Alignment among goals, contents, instruction, assignments and evaluation	**
12. Curriculum units integrated around key discipline-based concepts	*
13. Use of multidisciplinary approaches to instructional planning (including diagnosis in educational planning)	*
14. Presence of information in the curriculum on individual differences and commonalities (including handicapping conditions)	*
15. Presence of culturally diverse materials in the curriculum	*

Variables	Consensus Rating
Category V. Program Design Variables: (continued)	
V-C. Curriculum Design Variables	
1. Materials employ alternative modes of representation	*
2. Material is presented in a cognitively efficient manner	**
3. Materials employ explicit and specific objectives	**
4. Materials employ advance organizers	*
5. Materials employ learning hierarchies	*
6. Materials are tied to assessment and diagnostic tests	*
7. Availability of materials and activities prepared specifically for use with whole classroom, small groups, or one-on-one instruction	*
8. Degree of structure in curriculum accommodates needs of different learners	**
9. Student interests guide selection of a significant portion of content	*
10. Availability of materials and activities for students with different abilities	**
11. Availability of materials and activities for students with different learning styles	**
12. Developmental issues considered	*
13. Student experiences considered	*

Variables	Consensus Rating
Category VI. Implementation, Classroom Instruction, and Climate Variables:	
These are variables associated with the implementation of the curriculum and the instructional program. They include classroom routines and practices, characteristics of instruction as delivered, classroom management, monitoring of student progress, and quality and quantity of instruction provided, as well as student-teacher interactions and classroom climate.	
VI-A Classroom Implementation Support Variables	
1. Creation and maintenance of necessary instructional materials	•
2. Adequacy in the configuration of classroom space	•
3. Availability of classroom aides	•
4. Use of written records to monitor student progress	
5. Establishing efficient classroom routines and communicating rules and procedures	
6. Developing student self-responsibility for independent study and planning of one's own learning activities	••
VI-B Classroom Instructional Variables	
1. Prescribing individualized instruction based on perceived match of type of learning tasks to student characteristics (e.g., ability, learning style)	•
2. Use of procedures requiring rehearsal and elaboration of new concepts	•
3. Use of clear and organized direct instruction	••
4. Systematic sequencing of instructional events and activities	••
5. Explicit reliance on individualized educational plans (IEPs) in planning day-to-day instruction for individual students	•
6. Use of instruction to surface and confront student misconceptions	•
7. Use of advance organizers, overviews, and reviews of obejctives to structure information	•
8. Clear signaling of transitions as the lesson progresses	•
9. Significant redundancy in presentation of content	•
10. Teacher conveys enthusiasm about the content	••
11. Directing students' attention to the content	••
12. Using reinforcement contingencies	••
13. Setting and maintaining clear expectations of content mastery	••
14. Providing frequent feedback to students about their performance	••
15. Explicitly promoting effective metacognitive learning strategies	•
16. Promoting learning through student collaboration (e.g., peer tutoring, group work)	•
17. Corrective feedback in event of student error	••
18. Flexible grouping that enables students to work to improve and change status/groups	••
19. Teaching for meaningful understanding	••
20. Degree to which student inquiry is fostered	••
21. Scaffolding and gradual transfer of responsibility from teacher to student	•
22. Degree to which assessment is linked with instruction	•
23. Skills taught within the context of meaningful application	••
24. Good examples and analogies to concretize the abstract and familiarize the storage	••
25. Consideration of the teacher's use of language in the instructional process	••
26. Explicitly promoting student self-monitoring of comprehension	••

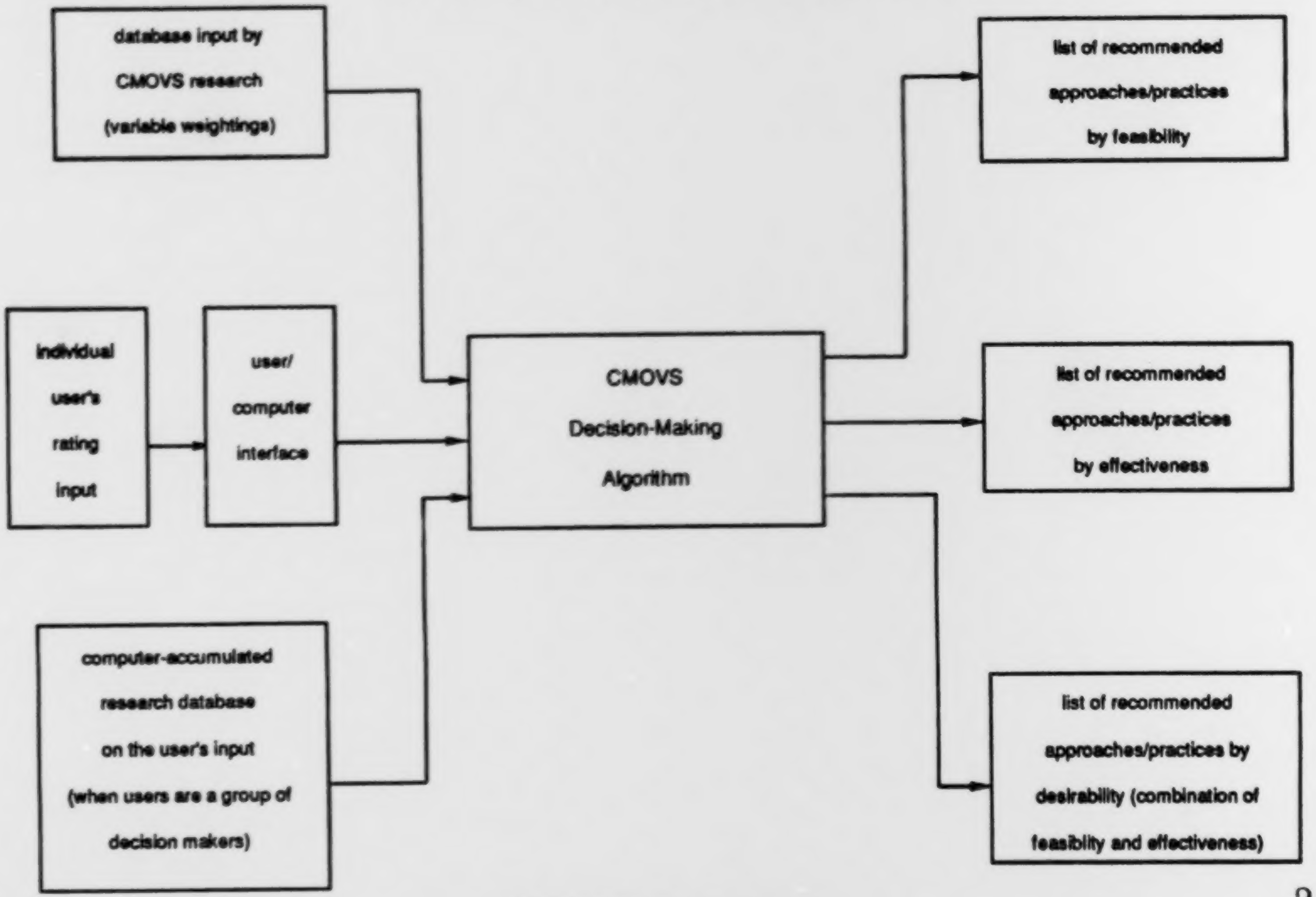
Variables	Consensus Rating
Category VI. Implementation, Classroom Instruction, and Climate Variables: (continued)	
VI-C. Quantity of Instruction Variables	
1. Length of school year	*
2. Length of school day	**
3. Time on task (amount of time students are actively engaged in learning)	**
4. Time spent in direct instruction on basic skills in reading	**
5. Time spent in direct instruction on basic skills in mathematics	**
6. Time allocated to basic skills instruction by regular classroom teacher	**
7. Time allocated to basic skills instruction by special education teacher	*
8. Difference between academic learning time and allocated learning time	*
9. Time spent out of school on homework	*
10. Time spent out of school viewing educational television	*
11. Time spent out of school in informal learning experiences (e.g., museum trips, scouts)	*
12. Nature of regular classroom content missed by students during participation in pullout programs	
VI-D. Classroom Assessment Variables	
1. Use of assessments to create detailed learner profiles rather than simple classifications or unlaborated total scores	*
2. Use of assessment as a frequent, integral component of instruction	*
3. Accurate, frequent measurement of basic skills in reading	*
4. Accurate, frequent measurement of basic skills in mathematics	*
VI-E. Classroom Management Variables	
1. Minimal disruptiveness in classroom (e.g., no excessive noise, no students out of place during instructional activities, no destructive activities)	**
2. Group alerting (teaching uses questioning/recitation strategies that maintain active participation by all students)	**
3. Learner accountability (teacher maintains student awareness of learning goals and expectations)	**
4. Transitions (teacher avoids disruptions of learning activities, brings activities to a clear and natural close, and smoothly initiates new activity)	**
5. Teacher "withitness" (teacher is continually aware of events and activities and minimizes disruptiveness by timely and nonconfrontational actions)	**

Variables		Consensus Rating
Category VI. Implementation, Classroom Instruction, and Climate Variables: (continued)		
VI-F.	**Student and Teacher Interactions: Social Variables**	
	1. Student initiates positive verbal interactions with other students and with teacher	*
	2. Student responds positively to questions from other students and from teacher	**
	3. Teacher reacts appropriately to correct and incorrect answers	**
	4. Teacher reinforces positive social interactions with students rejected by peers	**
	5. Teacher provides explicit coaching on appropriate social behaviors	**
	6. Teacher provides explicit coaching to reduce aggression	**
VI-G.	**Student and Teacher Interactions: Academic Variables**	
	1. Teacher asks academic questions frequently	**
	2. Teacher asks questions predominantly low in difficulty	*
	3. Teacher asks questions that are predominantly low in cognitive level	*
	4. Teacher maintains high post-question wait time	*
	5. Frequent calls for extended, substantive oral and written response (not one-word answers)	*
VI-H.	**Classroom Climate Variables**	
	1. Cohesiveness (members of class are friends sharing common interests and values and emphasizing cooperative goals)	*
	2. Low friction (students and teacher interact in a considerate and cooperative way, with minimal abrasiveness)	**
	3. Low cliqueness (students work with many different classmates, and not just with a few close friends)	*
	4. Satisfaction (students are satisfied with class activities)	**
	5. Speed (the pacing of instruction is appropriate for the majority of the students)	**
	6. Task difficulty (students are continually and appropriately challenged)	**
	7. Low apathy (class members are concerned and interested in what goes on in the class)	**
	8. Low favoritism (all students are treated equally well in the class, and given equal opportunities to participate)	**
	9. Formality (students are asked to follow explicitly stated rules concerning classroom conduct and activities)	*
	10. Goal direction (objectives of learning activities are specific and explicit)	**
	11. Democracy (all students are explicitly involved in making some types of classroom decisions)	*
	12. Organization (class is well organized and well planned)	**
	13. Diversity (the class divides its efforts among several different purposes)	*
	14. Environment (needed or desired books and equipment are readily available to students in the classroom)	**
	15. Competition (students compete to see who can do the best work)	*

APPENDIX B

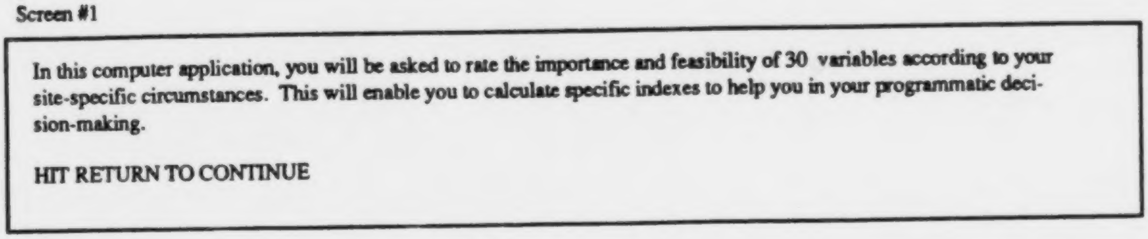
CMOVS Computer Analysis: User Ratings of Selected, Innovative Educational Practices

A Flow Diagram of the CMOVS Computer Program


database input by CMOVS research (variable weightings)
individual user's rating input
user/ computer interface
computer-accumulated research database on the user's input (when users are a group of decision makers)
CMOVS Decision-Making Algorithm
list of recommended approaches/practices by feasibility
list of recommended approaches/practices by effectiveness
list of recommended approaches/practices by desirability (combination of feasiblity and effectiveness)

Sample Screens From the Computerized Interactive Decision-Making Program

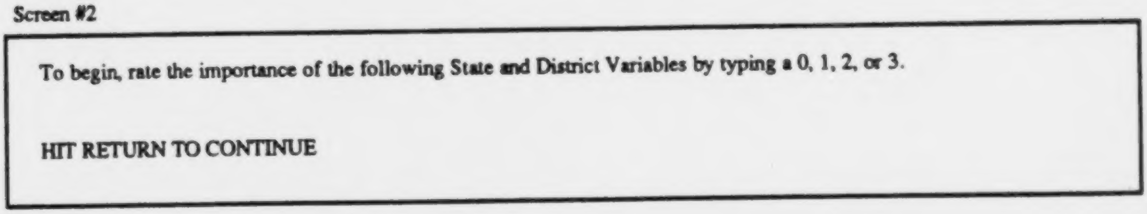
Screen #1



In this computer application, you will be asked to rate the importance and feasibility of 30 variables according to your site-specific circumstances. This will enable you to calculate specific indexes to help you in your programmatic decision-making.

HIT RETURN TO CONTINUE

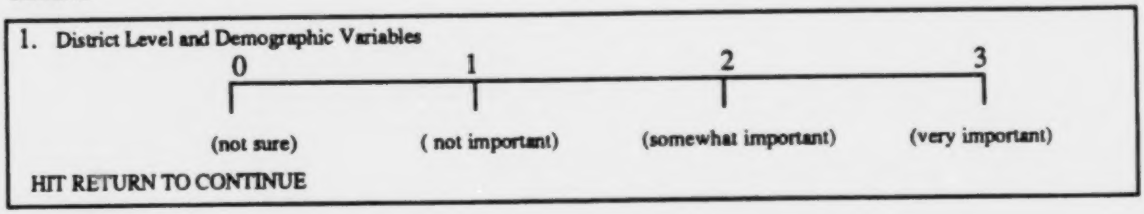
Screen #2



To begin, rate the importance of the following State and District Variables by typing a 0, 1, 2, or 3.

HIT RETURN TO CONTINUE

Screen #3

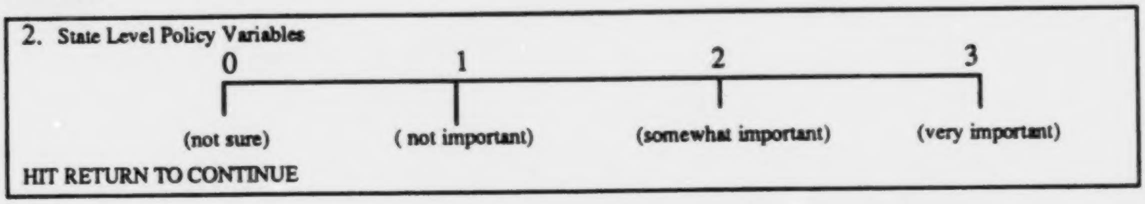


1. District Level and Demographic Variables

0	1	2	3
(not sure)	(not important)	(somewhat important)	(very important)

HIT RETURN TO CONTINUE

Screen #4



2. State Level Policy Variables

0	1	2	3
(not sure)	(not important)	(somewhat important)	(very important)

HIT RETURN TO CONTINUE

CMOVS Computer Analysis:
User's Effectiveness, Feasibility, and Desirability Ratings of Approaches/Practices

EFFECTIVENESS RATING

The following innovative educational approaches/practices are recommended in order of their effectiveness from the highest to the lowest according to the user's ratings:

Using a comprehensive & integrated approach to service delivery
score -- 146

Using a restructured classroom approach
score -- 120

Using a peer collaboration approach
score -- 86

Using a teacher collaboration approach
score -- 62

Using a curriculum modification approach
score -- 58

FEASIBILITY RATING

The following innovative educational approaches/practices are recommended in order of their feasibility from the highest to the lowest according to the user's ratings:

Using a comprehensive & integrated approach to service delivery
score -- 146

Using a restructured classroom approach
score -- 120

Using a peer collaboration approach
score -- 86

Using a teacher collaboration approach
score -- 62

Using a curriculum modification approach
score -- 58

DESIRABILITY RATING

The following innovative educational approaches/practices are recommended in order of their desirability from the highest to the lowest according to the user's ratings:

Using a comprehensive & integrated approach to service delivery
score -- 676

Using a restructured classroom approach
score -- 568

Using a peer collaboration approach
score -- 428

Using a teacher collaboration approach
score -- 292

Using a curriculum modification approach
score -- 276

DELIVERABLE 3-F

A Checklist for Descripton of Features of Programs that Aim
to Effectively Accommodate Mainstreamed
Special Education Students in Regular Education Settings

DELIVERABLE 3-F

A CHECKLIST FOR DESCRIPTION OF FEATURES OF PROGRAMS THAT AIM TO EFFECTIVELY ACCOMMODATE MAINSTREAMED SPECIAL EDUCATION STUDENTS IN REGULAR EDUCATION SETTINGS

Maynard Reynolds

University of Minnesota
and
Temple University Center for Research
in Human Development and Education

The research reported herein was supported in part by the Temple University Center for Research in Human Development and Education and in part by a grant from the Office of Special Education Programs of the U.S. Department of Education. The opinions expressed do not necessarily reflect the position of the OSEP and no official should be inferred.

USES OF THE CHECKLIST

This checklist is intended to be used as a rating instrument to assist in the design and description of classroom learning environments that provide for student diversity, including mainstreamed exceptional students.

The checklist has several specific purposes. They provide a framework for (a) describing the organizational characteristics of effective classes and schools based on consensus from the field; (b) description of implementation of effective instruction principles; (c) planning staff development activities; and (d) identifying the kinds of support and collaboration needed by teachers in order to accommodate exceptional students in their classes.

It is important to note that this checklist IS NOT DESIGNED TO BE, NOR SHOULD IT EVER BE USED AS, AN INSTRUMENT TO EVALUATE TEACHER PERFORMANCE.

Each scale included in the checklist contains five descriptions of school situations (numbered 1-5) which are sequentially ordered according to increasing desirability. The desirability scaling is based on research, public policies, and the "wisdom of practice." At the highest level, 5, the scales provide a description of learning environments that should serve all students very well, including those who are handicapped or gifted.

The checklist is intended to be used either by teachers as a guide for analysis of their own teaching situations and behavior, or by other school personnel, such as teacher colleagues, program developers, and instructional leaders for analysis of program implementation and staff development needs. When it is used by someone other than the classroom teacher, a number of procedures are used, including direct observation in the instructional situation, interviews with the teacher, interviews with randomly selected students and parents, examination of school records, and a survey of instructional resources.

On the page opposing each scale, suggestions are given on how to determine the ratings on that particular scale, along with a list of the key elements or concepts defining the scale. The key elements listed can be considered critical dimensions of the particular scale, and can be used as a checklist (indicators) to rate their presence or absence. In addition to the ratings of the level of implementation for each of the scales, the key elements list provides an extended description of particular learning environments. The presence or absence of key elements in each scale can be used in planning for improvements.

Planning for improvement in programming may be carried out by a teacher or through consultation with fellow teachers, other specialized colleagues, or outside consultants. To facilitate analysis of patterns of ratings, a profile chart is provided on the last page of this booklet. The chart may be used for individual classrooms or other instructional environments (such as laboratories, the gymnasium, music rooms, etc.), or a school as a whole. It provides a quick way to summarize implementation and identify areas that need improvement.

PROCEDURES

SCALE A: SPACE, FACILITIES, AND FURNISHINGS

Completion of this scale requires on-site observation in the classroom (or any other types of learning environments), preferably during instruction time. This scale involves the following key elements:

a. Space adequacy--is there enough room for comfortable performance of all learning tasks?

b. Sound control--can everyone hear all that is intended to be heard?

c. Provision of ramps, elevators, or other adjustments for elevation changes--for example, at entry ways

d. Storage space adequacy--for teachers and students

e. Adequacy of furniture--is there variety and appropriateness in desks, tables, chairs, etc.?

f. Possibilities of flexible arrangements of furniture

g. Accessibility to toilets, drinking fountains, lunch rooms, etc., for persons with disabilities

h. Appropriate lighting and light controls

i. Blackboards, bulletin boards, and other permanent places for writing and displays

j. Access to and resources for use of audio-visual, technical aids, and equipment (such as TV, computers, and tools when appropriate)

In addition to the general rating on the scale, the key elements list provides a description of the limitations and the possibilities for improvements in the space-facilities-furnishings domain.

Circle letters of items in the list above that need improvement.

SCALE A: SPACE, FACILITIES, AND FURNISHINGS

Check the one level of implementation most descriptive of the learning environment being observed.

_____ *1.* The classroom (or any other types of learning environments) (a) is essentially untreated for sound; (b) presents difficult elevation and entry problems for students in wheelchairs; (c) has no partitioned areas for small-group work; (d) is situated such that movement to washrooms, lunch rooms, and other essential areas is difficult for orthopedically or visually impaired students; (e) space is very limited--thus inflexible; (f) lacks adequate storage space; (g) furniture is limited in kind and flexibility; (h) lighting is inadequate

_____ *2.* At least six of the limitations (a through h, above) are characteristic of the classroom.

_____ *3.* General architectural arrangements (such as ramps in addition to stairs at entries) are adequate, but internal spaces are essentially untreated and inflexible. Furniture is moveable, but only moderately varied and flexible.

_____ *4.* Basic architectural accommodations are adequate. Classroom and other spaces are generally adequate in size and sound treatment is adequate; but storage, furniture, and flexibility of space are significant problems. Lighting and sound control are acceptable.

_____ *5.* The classroom is adequate in size; it is treated effectively for sound control (e.g., carpeting); access and entry present no problems for any student; storage is adequate, flexible partitioning is possible and furniture is moveable and includes various types.

PROCEDURES

SCALE B: RESOURCES AND SUPPORTS

Ratings on this scale are intended to reflect how well teachers are supported by appropriate school-wide and system-wide policies and procedures, adequate budgets for instructional materials, efficient transportation systems, limitations in class size, and other factors that go well beyond the control of individual teachers. The ratings should be based on interviews with the teacher, the school principal, and selected other staff members (such as school psychologists), examination of school records, and observation of ongoing school practices. Key elements of concern are:

a. Class size: possibilities of small group and one-on-one instruction when needed

b. Consensus among teachers and administrators on primary educational values and policies

c. Availability of necessary instructional supplies and materials

d. Availability (to teachers) of consultants to help solve difficult problems

e. Adequacy of staff development programs for teachers and other staff

f. Adequacy of contacts and collaboration with other community agencies (welfare office, child protection agencies, health clinics, etc.)

g. Scope, clarity, and implementation of policies on school attendance, disciplinary problems, and special education

h. Teacher involvement in school resource allocations

i. Efficiency of the transportation system for students

j. Availability (to teachers) of paraprofessional help in the classroom

k. Degree of discretionary authority given to teachers

l. Degree of school-wide curriculum planning and leadership

m. Clear, school-wide acceptance of responsibility for exceptional students

n. General quality of coordination among programs in the school

o. Degree of central office support and assistance to teachers

p. Materials available to permit alternative modes of representation in instruction.

Circle letters of items in the list above that need improvement.

SCALE B: RESOURCES AND SUPPORTS

Check the
one level of
implementation
most descriptive
of the learning
environment
being observed

_____ *1.* Teachers are "on their own" with essentially no consultation and assistance to meet needs of exceptional students or to solve other problems. Budgets for instructional materials are extremely limited. Principals and other administrators provide little coordination of services within the school or with community agencies. Transportation of students is a major problem, mainly because of time students spend traveling. Staff development programs are minimal. Class size tends to be large.

_____ *2.* Regular teachers are expected to communicate with special education staff, school psychologists, and others in planning for exceptional pupils; but communication is in fact limited and uncoordinated. Supplies of instructional materials are limited. Teacher aides (paraprofessionals) are unavailable. Training for mainstreaming is only beginning or ineffective. Functions of specialists and of regular teachers are only beginning to be clarified. Classes are quite large.

_____ *3.* Budgets for instructional materials are adequate. Supports to teachers by psychologists, special education staff, social workers, and others are quite limited and operate without clear policies and coordination by the principal. Regular teachers feel that their responsibilities for exceptional students is growing, but supports are limited and unpredictable. Concern for large class size is evident.

_____ *4.* Positive steps and progress are evident in providing resources and supports to regular teachers who serve students with diverse needs. Teachers receive consultation and assistance quite regularly and promptly when it is requested. A small program for providing classroom aides is in operation. Use of volunteers adds help. Curriculum materials and equipment are adequate to permit individualization of instruction by fully up-to-date methods.

_____ *5.* School-wide explicit and well-supported policies exist on attendance, discipline, crisis management, and LRE (least restrictive environment) principles. Teachers participate with others in decisions about resource development and utilization and lead the way in curriculum planning. Assistance by an aide is provided half-time to each regular teacher. Funding for instructional materials is highly adequate. Transportation is efficient.

PROCEDURES

SCALE C: SOCIAL ENVIRONMENT

Ratings for this scale should be based on observation of the class in operation and interviews with the teacher and selected students. Key elements here are:

a. Effective use of cooperative learning principles as one feature of program design

b. Teaching children to be effective in group processes

c. Evaluating students for behavior in groups as well as in more individualized work

d. Emphasis on sharing and mutual helpfulness among students as well as on competition

e. Use of peer and cross-age tutoring

f. Teaching students to be effective peer tutors

g. Systematic teaching of social skills

h. Exceptional students are integrated for social and instructional activities

i. Flexible grouping of students

j. Students share common interests and values

k. Peer group influences are positive re learning and schools

Circle letters of items in the list above that need improvement.

SCALE C: SOCIAL ENVIRONMENT

Check the one level of implementation most descriptive of the learning environment being observed.

_____ *1.* Students are expected to work essentially alone on learning tasks. Student-student relationships tend to be nonsharing and competitive. The teacher encourages and rewards individual performance but is unsystematic in use of group processes. Cliquishness of students hampers broader class cohesion and morale. Exceptional students often feel isolated and lack of respect.

_____ *2.* Students work mainly in isolation, occasionally in small groups. The teacher praises and supports friendly interactions but no systematic provision is made for instruction concerning group processes. Evaluation tends to be individually oriented and to encourage competition. No peer tutoring is provided.

_____ *3.* Students work in small groups frequently and must share materials; but all records are individual. Students are expected to learn to work with each other but goals for group work are nonspecific. Limited peer-tutoring is provided, with minimal preparation of students for these functions. Exceptional students often feel isolated.

_____ *4.* Students are clustered so that they can interact freely. Group projects are assigned with considerable frequency. Group projects are evaluated informally, but grade records emphasize individual achievements. Social skills are valued. Some peer-tutoring is conducted; students are well prepared and highly motivated for peer-tutoring activities.

_____ *5.* The development of positive social skills and effective group work behavior are avowed objectives of the teacher. Students are expected to interact and to help one another. Well-developed peer-tutoring and cooperative learning programs are conducted. The teacher teaches the skills of group processes and rewards effective group work. Definite efforts are made to provide socially integrative experiences for exceptional students. Grouping is flexible and changed as appropriate.

PROCEDURES

SCALE D: STUDENT SELF-DIRECTEDNESS

Ratings on this scale should be based on observations in the class, student interviews, and discussions with the teacher and school principal. Key elements to be considered are as follows:

a. Student participation in class and school management

b. Student leadership in school policy formation

c. Student knowledge of instructional materials, their use and storage

d. The teacher models meta-cognitive approaches to studying and learning

e. Students are taught and encouraged to be meta-cognitive or strategic about learning

f. "Scaffolding" (the gradual transfer of responsibility to students for learning strategies) is planned and implemented effectively.

g. Students make some choices about organizing their school activities

h. Students are held accountable for efficient and dependable school performance

Circle letters of items in the above list that most need attention and improvement.

SCALE D: STUDENT SELF-DIRECTEDNESS

Check the one level of implementation most descriptive of the learning environment being observed.

_____ *1.* The class is rule-governed, based on administrator and teacher authority. Students have little or no concept of their participation in class management and of strategic approaches to self-management for purposes of learning.

_____ *2.* Students share occasionally in discussions of how the school environment should be managed. A degree of "consent of the governed" is achieved. Students provide some help in managing materials and routines of the class. They are not encouraged to be self-managing in learning activities.

_____ *3.* Formal arrangements are made for the regular involvement of students in governance--as in student government, student management of classroom materials, weekly class meetings, and the like. They also are assisted in learning about and using efficient study procedures.

_____ *4.* Individuals and groups of students are given special training and responsibility for the management of the school environment and processes. Included, for example, are running audio-visual machines and orienting new students. In addition, training may be included in counseling skills (listening, reinforcing, etc.) and other aspects of interpersonal and group behavior. They are given some instruction in self-managed approaches to study and learning.

_____ *5.* Students share significantly in the governance (policy making and administration) of their classes and school. They are expected to help to make the learning environment productive. The teacher is the primary leader in the class but gives particular attention to encouraging constructive initiatives by students. Teaching students to be independently strategic about their own procedures for study and learning is an important part of the curriculum. The teacher models "metacognitive" procedures and expects/encourages similar behavior by students.

PROCEDURES

SCALE E: CLASSROOM MANAGEMENT AND CLIMATE

Ratings on this scale should be based on observations in the classroom. Key elements here are:

a. Effective techniques are used to control classroom disruptiveness

b. Teacher reinforcement of positive social interactions by students

c. Responses to teacher's attempts to alert the entire class

d. Teacher "with-it-ness" or awareness of what is going on

e. Management of transitions from one activity to another

f. Safety and orderliness of the school and class environment

g. Efficiency of class routines--the students know the routines and observe them

h. Record-keeping (by the teacher) is consistent and thorough

i. Rate of disturbing behavior by students

j. Sanctions for violating rules are clear

k. Sanctions for rule violation are exercised consistently and fairly

l. Self-confidence and enthusiasm for learning by students

m. Teacher-student interactions are mostly instructional rather than management-oriented

n. Relationships among students and between teacher and students are positive and caring; friction is low

o. School attendance is high by students and teachers

p. Impartiality (fairness) by teacher

q. Classroom atmosphere is active (low apathy)

r. Teacher enthusiasm

s. Freedom from "cliques" of students

t. Teacher maintains student awareness of learning goals and expectations, and holds students accountable

Circle letters of items that may need most attention for improvement.

SCALE E: CLASSROOM MANAGEMENT AND CLIMATE

Check the one level of implementation most descriptive of the learning environment being observed.

____ *1.* Classroom management is problematic. Only a minority of students tend to be thoroughly attentive or on task most times. Levels of friction among students and between teacher and students are high. Attendance is a problem.

____ *2.* Group signals and alerts by the teacher are generally well attended. At least half the students are on task at most times. Transition periods tend to be disorderly. Behavior disturbances are handled unpredictably. Materials management and record keeping are not systematic: Morale of students tends to be marginal.

____ *3.* Teacher-pupil and pupil-pupil communications and general management are adequate, but mainly on the basis of the high authority level of the teacher. Some favoritism is shown by the teacher. Student attendance in school is of concern, but not an extreme problem.

____ *4.* Communication is good; organization is complex but orderly; student attention level is high; disturbance rate is low. Teacher is creative and adaptive, shares responsibilities for the environment with students, and rationalizes rules in group sessions. Student satisfaction with the class and motivation are high. The teacher knows thoroughly what's going on in the class.

____ *5.* All students attend when teacher tries to alert the whole class; questions serve as signals for all students; systems for transitions, record keeping, materials management, and like matters are well understood and observed efficiently. Students are clear about expectations and consequences of their behavior. Interactions among students and with the teacher are positive. Teacher self-confidence and enthusiasm are high; favoritism is low. The environment is safe, orderly, and attractive for all persons.

PROCEDURES

SCALE F: TEAMING ARRANGEMENTS

Ratings on this scale should be based on discussions with the teacher, the school principal, the school psychologist, and other relevant staff. Examination of school policies and procedures also will be helpful. Following are some key elements for attention:

a. Policies and procedures for making referrals and requesting consultation by regular teachers

b. Participation of teachers in studies of exceptional students

c. Parent participation in child study processes

d. Class and school-wide work to avoid disorderly behavior

e. Maintaining "ownership" (responsibility for solving) of problems in regular classes

f. Frequency and quality of school-parent cooperation on positive developments of school climate and operations

g. Communications and mutual helpfulness among teachers

h. Use of consultation to help solve classroom problems

i. Use of broad modes of environmental and student analysis to treat instructional and behavioral problems

j. Systematic review and screening procedures to identify students who have special needs

k. Communication and coordination between regular and special education teachers--especially when they serve some of the same students

l. Leadership by the school principal in establishing effective communications and coordination of programs within the building

Circle letters of items above that most need attention and improvement.

SCALE F: TEAMING ARRANGEMENTS

**Check the
one level of
implementation
most descriptive
of the learning
environment
being observed.**

_____ *1.* When "problem" students are identified by regular classroom teachers, they are referred for study by specialists (e.g., school psychologists and special education staff) and will then be removed from regular classes.

_____ *2.* When "problem" students are identified in regular classrooms a referral is made to specialists. Specialists take the lead in writing an "Individualized Educational Program" (IEP) when eligibility for special education has been established. The diagnosis is almost exclusively child centered. Regular teachers and parents tend to be minor participants in preparing IEPs.

_____ *3.* When "problem" students are identified in the regular classrooms the teacher calls for consultation. This may involve other teachers, school psychologists, and others. Attention is given to alterations that might be made in the instructional environment as well as to characteristics of the student. Referral to special education may occur, but only after one or more "interventions" are tried and evaluated in the mainstream.

_____ *4.* When "problem" students are identified in regular classrooms support services are made available. The regular teacher participates in the study of the situation and in making plans for alterations to better serve the student. Classroom observations are made of the student and the regular classroom learning environment. Consultation with the classroom teacher to achieve program modifications is a part of the total process. Special education and regular class teachers communicate frequently about plans for exceptional pupils. Most special education is carried out in the regular classes through collaborative arrangements by special and regular teachers.

_____ *5.* Systematic analyses for preventative interventions are made to resolve "problems" of students before they become serious handicaps. These become the bases for broad efforts for improvement as well (e.g., providing additional approaches in reading instruction, increasing teacher competency in using small-group cooperative instructional groups, or increasing home-school interaction on truancy issues). Specialists are called upon for consultation with initial attention given to possible program modifications to accommodate students' needs in the regular classrooms.

PROCEDURES

SCALE G: INSTRUCTION

Ratings on this scale should be based on observations in the instructional environment. Key elements of concern are:

a. Intensity of instruction available to individuals

b. Clarity of instructional goals and objectives

c. High rates of time and success on tasks

d. Use of advance organizers (early outlines by teachers of content, structure, and expectations of lessons)

e. Direct instruction by the teacher--especially in introducing new ideas and skills

f. Monitoring of student performance on learning tasks

g. Frequency of feedback to students on performance on learning tasks

h. Accountability of students for high-quality performance

i. Provision of corrective feedback to students

j. Appropriate provision of redundancy in selected learning areas

k. Clear use of instruction to confront misconceptions by students

l. High expectations for learning

m. Use of questioning and other procedures to establish certainty about student understanding

n. Skills taught with careful attention to applications beyond school life

o. Systematic review and practice

p. Systematic use of homework

q. Care in checking on homework

r. Use of assessment procedures as an integral part of instruction

s. Flexibility and variety in instructional strategies

t. Use of good examples, analogies, metaphors, etc.

u. Use of positive strategies to facilitate generalization of concepts

v. Reinforcement principles are used systematically

Circle letters of items from the list above
that may warrant special attention
in efforts for improvement of instruction.

SCALE G: INSTRUCTION

Check the one level of implementation most descriptive of the learning environment being observed.

_____ *1.* Instructional goals and procedures are unclear and lacking in rationalization. Mostly the teacher lectures, uses routines designed to minimize "problems," and uses simple worksheets or drills to fill out class time. Reading and other assignments are made without carefully developed "advance organizers," such as outlines of lesson structures and introduction of new concepts by the teacher.

_____ *2.* Instructional goals are stated in course planning documents, but are not fully clear to students and parents. Instruction is mostly unsystematic in matters of advance organizers, redundancy, and review.

_____ *3.* Instructional goals are made clear by the teacher. Procedures are highly routinized. Academic learning time is a problem. Procedures do not reflect careful consideration of needs for redundancy, structure, and advance organizers.

_____ *4.* Instructional goals and expectations are very clear for everyone. Academic learning time (ALT) is high. Advance organizers are used occasionally. Instruction tends to be direct (highly structured, highly intense, and teacher directed, etc.) most of the time.

_____ *5.* Teacher uses advance organizers, systematic reviews, corrective feedback, frequent questions and other "effective" instructional procedures. ALT in the class is high. Direct instruction procedures (high density, teacher-structured) are used frequently, especially in introducing new topics. Helping students to restructure their knowledge is a primary concern. Instructional goals are explicit and clear. Redundancy is provided in instructional experience to enhance automaticity on appropriate skills and subject matter knowledge.

PROCEDURES

SCALE H: CURRICULUM FLEXIBILITY

Ratings on this scale should be based on interviews with the teacher, the school principal, and curriculum specialists (if any), on review of materials and examinations used in the classroom and on direct observation of instruction. Particular attention should be given to the following key elements of this scale:

a. School-wide clarity and agreement on major curriculum objectives and sequences

b. Variety of textbooks and other instructional materials to be used in work toward instructional goals and objectives

c. Degree of accommodation in programs to individual differences in previous learning, academic and other relevant skills and interests

d. The curriculum has been designed by teachers, not left just to textbooks for structure, content, and goals

e. Degree of discretionary authority given to teachers in individualizing programs

f. Variety of instructional resources (books, audiovisual aids, computers, equipment, etc.) available to teachers and being used effectively

Circle letters of items above
that might deserve early and special attention
in efforts to improve instruction.

SCALE H: CURRICULUM FLEXIBILITY

Check the one level of implementation most descriptive of the learning environment being observed.

____ *1.* Curriculum content is defined primarily by the textbook or teacher's guide, including the sequence of topics or activities. The content and sequence are uniform for all students.

____ *2.* The teacher basically follows a textbook or teacher's guide in setting content and sequence of topics but introduces significant modifications or "special" topics to accommodate to group's general interests and the teacher's judgement of priorities. The curriculum is almost totally uniform for all students.

____ *3.* The teacher basically follows a textbook or curriculum guide but uses more than one level or set of textbooks and other materials to meet individual needs.

____ *4.* Content for particular students is specified by the teacher; several levels of textbooks are used along with varieties of other instructional materials. Students are assessed individually and given tasks and materials of appropriate levels. Curriculum units are carefully sequenced in basic content areas.

____ *5.* Individual student interests and achievement levels are considered in selecting content. Instructional materials include several levels of reading materials, collections of audiovisual aids, instructional games and competency examinations, etc. Curriculum units are well integrated across content areas and in sequence.

PROCEDURES

SCALE I: ACCOMMODATION TO INDIVIDUAL DIFFERENCES IN PREVIOUS LEARNING

Probably no other aspect of the individualization of instruction and of accommodation of exceptional students is more important than understanding what individual students know and can do in the domains of instruction and then accommodating instruction to such differences. Ratings on this scale should depend on interviews with the teacher. Following are some key elements to be considered in completing this scale:

a. Careful and detailed assessment of each student's knowledge in the domain of instruction

b. Flexible variation in curriculum pacing for individuals

c. Intensification of instruction for students who show initial slow progress

d. Flexibility of grouping for instruction

e. Probes for student understanding and misunderstandings

f. Resources available for support of students showing learning problems

g. Planned activities for students who show rapid progress

h. Recognition of outstanding progress and achievement

i. Student self-monitoring procedures for study and of comprehension

j. Student motivation for continual learning

k. Student perseverance on learning tasks

Circle letters of items above to show areas needing improvement.

SCALE I: ACCOMMODATION TO INDIVIDUAL DIFFERENCES IN PREVIOUS LEARNING

Check the one level of implementation most descriptive of the learning environment being observed.

____ *1.* All students are given fixed, uniform assignments to complete in uniform periods of time with little or no regard to differences among students in previous learning.

____ *2.* All students are given uniform minimum assignments for standard periods of time. Students who complete work rapidly usually are free to work on unrelated activities. Students who do not complete work "on time" continue with classmates in the next assignments despite poor background. Some extra help may be given to the slowest learners.

____ *3.* All students are given uniform minimum assignments for standard periods of time. Students who complete tasks rapidly and well are allowed informally to proceed to more advanced related topics. Students who fail to complete tasks satisfactorily are given extra tasks and/or assigned to resource teachers or others for individual help.

____ *4.* Students are given mastery examinations at set times, such as the beginning of each semester. After each evaluation, subgroups based on ability to proceed at different rates and at different levels of the curriculum.

____ 5. Instruction is planned, taking into account results of mastery examinations and specific probes by the teacher to assess specific achievement background and possible misconceptions of students. Entry to new areas may proceed at any time according to the individual student's demonstrated readiness.

PROCEDURES

SCALE J: EVALUATION

Ratings on this scale should be based on interviews with the teacher and examination of tests and other evaluative devices used in the instructional situation. It will be important as well to interview representative students to check on their participation in evaluation processes and on their understanding and use of the results of assessment data. Following are some of the key elements worthy of special attention in making the rating on this scale.

a. Use of criterion-oriented as well as norm-referenced assessment

b. Use of assessment data as integral parts of instruction

c. Care in relating tests to the local curriculum

d. Use of multiple evaluation modes, going beyond traditional testing

e. Prompt and thorough reporting of assessment data to students

f. Assisting students in interpretation of assessment data

g. Student use of assessment techniques to monitor their own performance

h. Periodic reporting of assessment data to parents

i. Use of mastery-oriented testing procedures (students are assigned to re-teaching or advanced subjects on the basis of mastery exams)

j. Use of evaluation procedures to assess the effectiveness of instruction and programs within the class

Circle letters of items above on which improvements may be most important.

SCALE J: EVALUATION

Check the one level of implementation most descriptive of the learning environment being observed.

____ *1.* Evaluation is almost totally test oriented and involves comparisons with other class members. Results are recorded as percentiles, percentages, or comparative grades, usually with no breakdown for diagnostic purposes. Scores are not interpreted in "mastery" terms. Atmosphere stresses grades and competition. Linkage of testing to the curriculum is limited.

____ *2.* Evaluation is test and norm oriented, but with careful attention to domains (or what is being taught). Some modest degree of use is made of results in assigning "make-up" work or in other limited adjustments of the program.

____ *3.* Evaluation is targeted precisely on what is being taught. All exams are returned to pupils but attention is mainly on grading, rather than on the planning of instruction.

____ *4.* Most assessments are mastery oriented and specific to domains, and they are used effectively and regularly in planning instruction. Feedback to students on all tests is complete and clear. However, term grades tend to be assigned quite strictly on a norm or social comparison basis. Students are encouraged to monitor and evaluate their own work independently.

____ *5.* Assessments are partly test oriented but they include informal observations and assessments as well. All evaluation is specific to domains and mastery oriented. Assessments are frequent and integral parts of instruction. Occasionally, norm-oriented tests are used (with older students) to give them a basis for comparing their rates of development with those of others. All students have a solid chance to sense their own progress. Students evaluate their own learning as part of the total evaluation program.

PROCEDURES

SCALE K: APPRECIATING CULTURAL AND INDIVIDUAL DIFFERENCES

Ratings on this scale should be based on observations of the decor of classrooms (checking on pluralism in orientation to art, special events, holidays, festivals, etc.), and interviews with the teacher, representative students, and the school principal. These are some of the special key elements to be considered:

a. Staff understanding of the cultural background of students in the class (or school)

b. Provision of services for students whose primary language is not English

c. Valued consideration of artifacts, art, history, aesthetic experiences from all cultures, especially those represented by student body

d. Welcoming of parents of minority students into school affairs

e. Presence of culturally diverse material

f. School-wide and district-wide leadership in staff development activities to foster understanding and appreciation of cultural differences

Circle letters of items needing attention.

SCALE K: APPRECIATING CULTURAL AND INDIVIDUAL DIFFERENCES

Check the one level of implementation most descriptive of the learning environment being observed.

_____ *1.* Instruction proceeds with little or no explicit recognition of cultural differences. Majority values and styles dominate the classroom.

_____ *2.* Special arrangements for extra help are made for students who have second language problems or who have unusual developmental patterns and learning styles. Teachers have had human relations training.

_____ *3.* Special projects oriented to needs of minority students are arranged to supplement the regular school program: such as special pre-school language classes, bilingual youth advocates, or special units in Native-American education or Black studies.

_____ *4.* Efforts are made to go beyond special projects and to redesign the basic curriculum to include valid elements from all relevant cultures so that all children can feel that their cultures are given studied and valued consideration.

_____ *5.* Content, materials, and methods of instruction are made meaningful for poor and minority group children as well as all others; the commitment to cultural pluralism is real, especially as it is reflected in curriculum. Both students and parents from minority communities feel engaged and well understood in the school situation; they feel like equals among equals. Aesthetic school experiences include samples from all cultures.

PROCEDURES

SCALE L: CHILD STUDY PROCESSES

Ratings on this scale should be based on interviews with psychologists or others who are involved in making special studies of students, interviews with the teacher, and examination of school records, especially those that will reveal how individual children are studied and understood. These are key elements to be noted:

a. Adequacy of school-wide record systems for students

b. Degree of systematic use of cumulative school records on students

c. Clarity of policies and procedures for studying particular children when requested by teachers or parents

d. Extent to which the study of a child is extended to a study of his school, home, and total life situation

e. Extent to which special studies are oriented to improvements in programs offered to children and not simply to issues of classification and placement of the students

f. Involvement of psychologists and other specialists in efforts for program development

g. Degree of effective interaction between educators and representatives of community agencies outside of the school (mental health clinics, welfare offices, etc.) in serving the needs of particular students and in community development

h. Adherence to the spirit (as well as the legal requirements) of the least restrictive environment principle in student placements

Circle letters of items most needing attention.

SCALE L: CHILD STUDY PROCESSES

Check the one level of implementation most descriptive of the learning environment being observed.

____ *1.* There is no structured child study process. Children who do not conform to expected behavior or achievement norms are dealt with through referral and placement in isolated special programs.

____ *2.* Child study is seen as a problem-centered effort to identify and categorize children's deficits using standardized psycho-medical tests and to determine appropriate placements external to the regular classroom. Specialists, such as psychologists, are mainly occupied in classifying and labeling students for special programs.

____ *3.* Child study is based heavily upon standardized assessment instruments to diagnose and classify the child's deficits in accord with state and federal guidelines for special education and other categorical programs. Plans for help often involve regular teachers with some supportive help by special educators.

____ *4.* Child study is educationally-oriented, with child, his/her teacher, and parents central to process and focus on analyzing teaching-learning processes to determine areas where efforts for improvement should be concentrated. Systematic screening procedures are used to identify children with special problems (for example, limited vision or poor reading ability).

____ *5.* Child study is focused on positive development of increasingly accommodative learning environments. Children's diversity in needs and abilities are closely examined, not to identify deficits in children but rather to plan modification in school practices and in school/home environments. Specialists, such as psychologists, are heavily involved in program development as well as in child study. Systematic screening procedures are used to identify students who may need intensive studies of vision, hearing, behavioral, and learning problems. The school cooperates with other agencies to serve children and their families.

PROCEDURES

SCALE M: PARENT-TEACHER COLLABORATION

Ratings on this scale should be based on interviews with the teacher, parents, and the school principal. It will be helpful to examine report cards and other reporting procedures used by the school. Contacts with representatives of advocacy groups concerned with disabled persons should be made, if possible. These are some of the key elements to be observed.

a. Frequency and quality of teacher-parent contacts

b. Involvement of parents in school policy development

c. Parent participation in IEP[1] conferences and other meetings concerned with exceptional students

d. Parental involvement in positively oriented programs relating to school attendance and tardiness, discipline, expectations for academic attainments and monitoring homework assignments

e. Trust in relations between teachers and parents

f. Parent training for functions in planning and monitoring programs for exceptional students

g. Parental expression of affection to children and interest in their school work

h. Parental expectations for academic success

i. Helping parents to become involved in assisting and monitoring students in their school work

j. Informing parents about school behavior and progress of their children

Circle letters of items above that
deserve high priority in efforts for improvement.

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[1] Individual Educational Plans, as required by law in the cases of handicapped students.

SCALE M: PARENT-TEACHER COLLABORATION

Check the one level of implementation most descriptive of the learning environment being observed.

_____ *1.* Parent-teacher communication is mainly through formal "report cards;" otherwise, limited to crisis-stimulated meetings, often adversarial in nature, or to conferences required under governmental law, rules, and regulations. Administrators enter mainly as rule enforcers and record keepers.

_____ *2.* Parent-teacher interactions, in addition to crisis-stimulated meetings, occur on a regularly scheduled basis throughout the year; the agenda is characteristically limited to the teacher's reporting on child's progress.

_____ *3.* Parent-teacher interactions, in addition to crisis meetings and formal reports, include periodic meetings with all parents to communicate informally children's positive behaviors and achievements. Parents support school-wide emphasis on school attendance, achievement, and orderly behavior. Parents of exceptional students attend IEP meetings but their functions are limited.

_____ *4.* Parent-teacher interactions are characterized by an open and trusting climate of communication within which problems and crises are seen as the cause for common concern and investment in solutions; parents and teacher participate in both formal and informal information sharing. Parents know about homework and help their children in meeting school expectations; this includes monitoring of ways students use time (e.g., limited TV viewing). Parents of exceptional pupils participate actively in IEP preparation.

_____ *5.* Parent-teacher cooperation is close and continuous. As collaborators in program planning and evaluation, as volunteer aides, as participants in various school committees, as co-sponsors of school-community activities, parents join with teachers in enhancing and expanding children's learning and experiential opportunities. The atmosphere stresses creativity, mutual commitments, and trust. Administrators enter as leaders/ facilitators. When severe problems occur, parents, teachers, and other school officials are able to work together cooperatively in service to the child and not as adversaries. Parents of exceptional students have received special orientation and training and participate fully and confidently in IEP preparation.

Profile Chart

This chart provides a sample profile of program implementation. The X's in the chart indicate the specfic level of implementation obtained for each scale. For example, the profile shown below indicates that the implementation of scale A (Space, Facilities, and Furnishings) is at level 4, the implementation of scale B (Resources and Support) is at level 3, and so on.

	LEVEL				
SCALES	1	2	3	4	5
A. Space, Facilities, and Furnishings				X	
B. Resources and Supports			X		
C. Social Environment		X			
D. Student Self-Directedness		X			
E. Classroom Management and Climate			X		
F. Teaming Arrangements		X			
G. Instruction			X		
H. Curriculum Flexibility		X			
I. Accommodation to Individual Differences in Previous Learning		X			
J. Evaluation			X		
K. Appreciating Cultural Differences				X	
L. Child Study Processes			X		
M. Parent-Teacher Collaboration				X	

APPENDIX
REVIEWERS' COMMENTS

MICHIGAN STATE UNIVERSITY

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December 26, 1989

Professor Margaret C. Wang
Center for Research in Human Development and Education
Temple University
9th Floor, Ritter Hall Annex
Philadelphia, PA 19122

Dear Margaret:

As requested, I'm writing to provide feedback concerning the drafts you sent me of papers reporting findings from the project "Designing and Evaluating School Learning Environments for Effective Mainstreaming of Special Education Students: Synthesis, Validation, and Dissemination of Research Methods."

Jere Brophy
Professor of Teacher Education, and
Co-Director, Institute for Research on Teaching

JB/ct

I know that you will find many of these observations troubling, but I hope that you will find them helpful, at least ultimately. I think that you have made some important contributions here in identifying the variables on which there is some consensus and giving some indication of the relative importance that experts assign to them. However, I have suggested several cautions and qualifications that should be included in communicating this information (most notably, those involving distinguishing correlationa from causality, considering qualitative in addition to quantitative aspects, and weaving variables together into coherent explanations rather then just listing them separately). Finally, although I applaud your intentions, I have serious reservations about your attempts to translate this information into tools for use by practitioners. Your decision making frameworks seem to be unnecessarily complicated by dubious mathematical computations, and your "ADAPT" scales leave much to be desired both in terms of the empirical evidence supporting many of the individual items included on them as well as the problems introduced by combining many separate items into a single scale.

Unfortunately, I am more confident in identifying problems here than in suggesting solutions, but my general impression is that you would do well to either simply drop or else severely modify/simplify your "ADAPT" scales, as well as to simplify your decision making frameworks. I believe that I would use the table included in "Effective Educational Practices: A Concensus on Learning" as the basis for suggesting decision making frameworks and assessment scales, or perhaps even the shorter lists comprised of Tables 1 and 2 in the paper "The Knowledge Bases for Special and Regular Education." These would have the advantage of concentrating on those variables that are considered most important, without wandering into those that have more dubious support for inclusion in the first place.

Once again, I hope that you find these comments helpful. If I can be of additional assistance let me know. Meanwhile, I look forward to seeing you in Boston, if not sooner.

Best Regards,

and with the scales themselves. Most of them struck me as mushing together many different variables and issues into a single scale in ways that would make the scale hard to use. I would keep separate things separate and go with actuarial combination of separate ratings to yield summary ratings, or if I didn't trust this for some reason and thought that I needed summary ratings that depended on rater judgment, I would provide raters with the kinds of procedures lists that you include on the even-numbered pages in this report, but would simplify the scales considerably, taking out most of the specifics that you have included on the odd-numbered pages of this report. In particular, I would take out those specifics that do not seem to relate well to the other things included or that appear on only certain parts of the scale but not other parts. For example, partitioned areas for small group work are mentioned in Level 1 of Scale A. It is not clear to me that there is any literature to support this being included in the scale in the first place, but even if there were, why is this variable mentioned only in Level 1 of the scale? Similarly, class size is mentioned in Levels 1, 2, and 3 of Scale B, but not in Levels 4 or 5. Transportation is mentioned in Levels 1 and 5, but not in the levels in between. In Scale C, individual grading is mentioned in the first four levels but not the fifth. Furthermore, it is mentioned as a negative factor, when Slavin's reviews of small group and cooperative learning techniques suggest that it should be listed as a positive factor if student learning gain is the outcome measure. Scale D mixes variables ranging from school governance to self-regulation of learning efforts by individual students.

In Scale F, I believe that I would substitute for the term "child centered" used at Level 2. I think I know what you mean here, but this term has an earlier history that would cause many individuals to think of its other meaning. This will be confusing, not only because it isn't the same meaning that you intend to use, but it is a positive meaning, where as you intend a negative meaning.

Scale G: besides being cluttered with uncorrelated items, this scale does not progress clearly from 1 through 5. Also, it includes the ALT concept, which has not been clearly correlated with student learning gains (merely with student time on task). Scale H: is there any empirical evidence supporting any of this? Scale I: again, is there any evidence for any of this? Is all this grouping and individualizing needed? Is it good for students? I doubt it.

holder approval ratings to calculate a promotion index (assuming that a promotion index is needed in the first place)?

In summary, the tools suggested here strike me as long on mathematics but short on conceptual clarity and validity. I would be inclined to dispense with the calculation procedures and simply present the list of variables to potential users along with some guidance about the logic involved in some of the different questions that need to be addressed.

Finally, looking at the variable list in the tables, I have some concerns about the validity of including certain variables as if the literature supported their relationship to learning outcomes. In particular, in Section D of Category III, I am not sure that the literature supports multi-age grouping, instructional teaming, cross-age tutoring, peer tutoring, or academic tracking as correlates of learning outcomes. Similarly, I would question all of the variables listed in Section A for Category V, as well as some of those in Section B (use of personalized instructional program, use of prescriptive instruction combined with aspects of informal or open education, use of diagnostic-prespective methods, use of computer-assisted instruction), and Section C (materials employ learning hierarchies, materials are tied to assessment and diagnostic tests).

In Category VI, the third last variable in Section B should end with the word "strange" not the word "storage."

In Section H at the end of the list, I would question the inclusion of "diversity" and "competition." Not only are these questionable in terms of whether the process-outcome literature supports their association with learning gains; they seem to contradict other variables in the list, even in this same set. How do you square diversity with cohesiveness of instructional program? How do you square competition with cohesiveness of the social relationships among students, low friction, and so on?

Finally, I had similar difficulties with the "ADAPT" paper. That is, although I sympathize with your attempts to provide educators with the useful tool, I had problems with many of the things included in these scales measurement that must be included if the purposes or goals are to be accomplished at all. If in the process of responding to realistic pressures, the primacy of this purpose or goal becomes subordinated to feasibility concerns, it is possible for one to end up with measures that simply do not do what one wants them to do. Thus, I would caution you to keep in mind the distinction between doing something as cheaply as possible versus failing to do it at all.

I had mixed reactions to the paper entitled, "A Decision-Making Framework for Description, Selection, and Evaluation of Innovative Education Programs." I like your attempt to provide a useful tool to assist educators in complex decision making, and I like the model summarized in Figure 1. As I got deeper into the paper, however, I found more and more things that raised concerns.

First, several of your "factors" described on page 9 appeared to be mixtures of separate issues rather than clear factors. Instructional time and assessment strike me as two different things, as do cognition and motivation. Thus, I would question the statement on page 9 that the factor analysis results suggest that similar subcategories are grouped together and reflect the ways that educators think about education.

I also had problems with the logic involved in your suggestions about how the CMOVS might be used. First, if the point is to assist local educators in deciding what they need to emphasize, why not just present them with the list and dispense with the mathematics calling for multiplying their own priorities by the weighting emerging from your analysis of expert opinion? Second, why multiply (instead of just add or use some other metric for generating scores)? It seemed to me that the multiplication approach gave undue weight to the "three times three" intersections relative to other relevant intersections in the matrix.

Third, qualitative aspects of these variables are not considered.

Fourth, I am not sure that the several different indexes that you suggest are really worth separate calculation, or that it makes any sense to keep weighting in the expert opinion aspect when trying to assess feasibility of implementation. Similarly, why factor in the importance rating when considering stake

A related problem is emphasis on presece/absence or quantity of a variable rather than its quality. Yet, we know that the value of aides or homework is determined not just by whether or not they are present but by whether they are appropriate and used for the right purposes; the value of school improvement program depends not just on whether or not one is in place but on whether the program is well designed and suited to local needs; and so on.

I'm not sure how much you can, or even want to, do much about this problem in these reports, but I think that you should at least allude to the fact that this method, although useful in many respects, produces lists of disconnected variables that need to be interpreted within coherent explanations of good teaching.

Page 14: your "student/teacher interactions: social "variables" appears to be misleadingly labeled, given the nature of the two most important ratings listed at the top of this page. These both refer to academic rather than to social interactions. I would suggest reconsidering the label for the variable to change it to something that makes the academic or content-based nature of the discourse more obvious.

Concerning the paper entitled, "Operationalizing the Marker-Variable System: Researchers' Selection of Measurement Techniques," I saw it as clear and well written as far as it goes, but incomplete as a report because it is based on only partial data and doesn't really discuss the findings in much detail. I am not sure that it would stand alone as a separate report. If you intend it to do so, I think you should identify your audience and goals more clearly and write the report accordingly.

Other than this general comment, I have only one additional response to the paper. On page 11, you mentioned the "five minutes, five cents rule" in the process of discussing realistic pressures to keep measurement to a minimum of time and trouble to all concerned. I understand these pressures and agree that they need to be taken into account, but I would suggest that these feasibility issues be more clearly recognized as secondary to the more primary issues of purpose and validity of measurement. For any given purpose or goal that calls for taking scientific measurements, there is some irreducible minimum of

Although I am generally positive about your procedures, there are a few places where discrepancies occur between the ratings of the various groups and the conclusions to be drawn from process-outcome research. This sometimes leaves me a bit uneasy. For example, on page 11 I note that the raters perceived the availability of aides as a significant factor fostering student learning. However, my perception is that the empirical literature does not support this common perception. The same would be true of beliefs about materials employing learning hierarchies mentioned on page 12. On page 13, group alerting is given a higher rating than smooth transitions, minimal disruptions, and teacher withitness, when the empirical data suggest the opposite. Similarly, time spent on homework is perceived as an important correlate of learning, when Cooper's recent thorough of meta-analysis reveals that it is uncorrelated at the elementary grades and positively but weakly correlated at higher grades. Once again, I find myself unsure as to what to advise you to do (if anything) about these discrepancies between expert opinion and empirical data, but I felt the need to point them out to you and suggest that you think about the matter.

In a sense, these problems are additional manifestations of the larger problem mentioned earlier - that you have here lists of variables treated in isolation rather than coherently written networks of information about major topics on teaching effectiveness. This makes for a lack of coherence in the presentation and problems in attempts to develop educational policy decisions based on what you do present. Coherent explanations of findings on classroom management, for example, point out that the most basic determinants of managerial success are those surrounding clarity of expectations, teaching of routines, maintenance of signal continuity and momentum when teaching lessons, and withitness and associated quickness to respond appropriately when potentially disruptive behavior occurs. Group alerting is one potentially appropriate managerial technique, but it shows curvilinear rather than linear relationships to learning outcome, basically because if too much group alternating is going on this means that too much student inattentiveness is going on, which in turn means that some of the more basic things (mentioned above) are not being done correctly. This kind of coherent discussion of a network of related variables, emphasizing the relationships among them in addition to their individual relationships to learning gain, is what is missing from all of these reports.

student learning, yet your language here and in the rest of your reports speaks of "influence on learning" and related causal inferences. In short the vast majority of the literature you reviewed was correlational, yet you treat the relationships as if they were demonstrably causal. I'm not sure what to advise you to do about this, other than to recognize the problem and do something. At minimum, you should recognize the problem in your discussions and adjust your language accordingly.

A related problem, at least to me, is that strength of influence (translated as size of correlation or effect size) is not as important as directness of influence in evaluating the relationship of a predictor variable to student learning gain. Certain variables such as opportunity to learn (content coverage, time on task, and related variables) are both directly causal and powerful compared to other variables. Other variables (praise of good answers, frequency of testing) might be more correlationally than casually related to student learning, even if they should sometimes show high correlation with it. Still other variables may be directly causal yet have only modest correlations, often because they apply only to certain situations (use of advance organizers, modeling of strategy use prior to release of students for work on a complex assignment). These latter variables are quite important, however, even if they do not have as high correlations with learning outcome as the first set of variables mentioned above. Ultimately, teachers, administrators, and teacher educators need coherent statements about how to handle various teaching situations and explanations of why these approaches are better than the alternatives, not just lists of isolated variables accompanied by indications of their strength of relationship to learning.

Page 6: Your categories and items struck me as sensible and well organized. Page 7: So did your focusing of the search on authoritative sources. Later on page 7, you mentioned keeping notes about limitations and qualifications on findings. Were these ever used or taken into account in discussing the findings? My sense is that they weren't. Is this because there was nothing there worth making a point of, or simply because you moved ahead with the work and never looked back?

Page 10: I was happy to see your emphasis on the change in the conventional wisdom since the Coleman report. This point is still worth making.

plus the reader could see the strength of relationship before reading the variable rather than only afterwards.

I have my doubts about the value of this paper as a pamphlet, if that is what it is intended to be, unless the raw data are elaborated somewhat more through accompanying prose stressing the main ideas that you want the readers to develop in connection with the raw data presented here. The raw data by themselves simply won't do the job for the vast majority potential readers. If you really do intend this to be a pamphlet, however, I believe that the problem could be remedied with a page or two of carefully selected and worded prose.

Finally, I have my doubts about the value of Table 1, at least when it is presented independently of other information, such as the numbers of variables in each of these categories that were mentioned in the literature and thus could have been rated as effective practices. Also, the sheer numbers in these categories are not especially meaningful by themselves. I would guess, for example, that classroom management variables are more powerful determinants of learning than the student and teacher interaction (social) variables, even though you list six of the latter and only five of the former. In other words, the numbers of variables in each category may have more to do with the degree to which the category has received the sustained scientific attention leading to sharpened conceptualization, definition, and categorization, rather than necessarily differences in the inherent importance of the category.

I found the paper entitled, "What Influences Learning? A Content Analysis of Review Literature" to be a well written and basically complete (although page 3 was missing in my copy) scientific report of your project. I do have a few issues to raise for your consideration, however.

On page 5 of this report (and in various places elsewhere in your papers) you note that you coded reports for the reported strength of the influence of a variable on learning. This is elaborated on page 8. My concern is that your procedures focused on correlational relationships between these variables and

In general, I found the papers to be clear and reasonably complete in describing scientific procedures, but variable in the degree to which they had been developed to final form and in their practical usefulness. I will discuss each in turn.

I found the paper entitled, "The Knowledge Bases for Special and Regular Education" to be a good basic report of your major procedures and findings. I thought that your basic questions were important, and I like your plan for addressing them, particularly your focus on alterable variables and your focus on authoritive sources in preference to trying to review every conceivable source. I found the pattern of high positive correlations across the different groups of respondents reassuring, as well as the lists of high-concensus variables themselves.

I have just a brief correction and a possible addition to suggest for this paper. The correction concerns the statement on page 5 that the lowest correlation in Table 4 was .80. In fact, Table 4 itself shows a correlation of .77 for the relationship described on page 5, as well as another correlation of .78.

My suggested addition concerns your discussion. Scanning the data, I noted that the state and local administrators tended to place more emphasis on support variables than did the teachers and researchers, and also that the two groups of teachers tended to put more emphasis on classroom management and climate variables than the other groups did. You might want to add these observations to your discussion, and perhaps make the larger point that each respective group of experts tended to place higher emphasis on those variables that are emphasized in their domain.

I have mixed reactions to the paper (described as a pamphlet inside) entitled, "Effective Educational Practices: A Concensus on Learning." First, I found this very useful as an appendix to the paper described in the previous paragraphs, and I would encourage you to use it for that purpose in addition to whatever other purposes you have in mind for it. In that regard, I would suggest a change in format: placing the asterisks currently given on the right side of the Table over on the left side, right to the left of the variable numbers. This would make it easier to read the relationships between variables and asterisks,

REVIEW COMMENTS
on
drafts of three papers
from
"Designing and Evaluating School Learning Environments for Effective Mainstreaming of Special Education Students: Synthesis, Validations, and Dissemination of Research Methods"

by Robert A. Burnham, New York University

Introduction

I believe that his research on learning is very significant to both academics and practitioners. Readers are less apt to want to replicate the work than to utilize its results in their educational practice. Therefore, the primary thrust of my review comments will be to suggest ways of revising your articles to allow for broad use of the research.

General Comments

Since these papers describe the understanding of researchers Wang, Haertel, Walberg, and/or Reynolds of the relationships and implications of the work of numerous others regarding school learning environments, I am not in a position to evaluate either the selection or even the interpretation of that body of research. I believe my comments must be limited to answering the following general questions:

- Do these papers either add to an educator's understanding of this area of research or simplify his or her acquisition of a body of research knowledge?

- Will study of these papers enable educators to improve the learning environments in which they operate?

- Are the research findings presented in a manner which communicates both clearly and attractively to busy educators?

- Do the materials permit readers with particular questions or interests to pursue them in additional depth?

If these papers are to be published for practitioners rather than for other academics, as I hope they are, I recommend stylistic changes as follows:

- When you must list a series, use bullets and indent to vary the narrative structure.

- Do not keep repeating lists found in tables. Instead, use briefer tables in the text where the data are discussed. Refer in the text to the availability of additional information in an appendix, if necessary.

- Where the tables are long, consider whether the information should be in narrative rather than tabular form. If it is essential to the reader's understanding of the research, we should not have to flip to the end to find it.

- I realize you are inserting transitional sentences, but I suggest that you put the introduction to each section at the beginning of that section rather than at the end of the previous section.

- Use active voice and present tense wherever possible to give a crisp and current tone to the papers.

- Use sub-headings at various levels—even more than you do in the drafts—to guide the reader through.

- Use a table of contents for each paper.

- Use brief explanations of research procedures in the introductions to each paper. Put lengthy explanations of research procedures either in the appendix or as a "sidebar" to the discussions of the findings.

- Each of the papers should be edited for missing or extra words, inconsistent tenses, and subject/verb agreement. (While I did not try to edit the papers, I am returning them to you with my comments for whatever value that may be to you.)

- Provide examples of applications of the research, e.g. how one group of special and regular teachers might decide how to change their learning environments or several steps which might be taken

While this would lengthen the papers, moving research details to a less visible location would enable easier use of the research findings.

I recommend that each report begin with an easily understood and attention-grabbing section which tells the reader what the "news story" is and why it is important. Then follow the news with how you located the facts and what the story means for educators and for students. This is, of course, journalistic style, not the usual research style; however, your work is important enough to be read by educated adults who read good newspapers. We need not apologize for being interesting!

Will readers be able to follow-up on questions and concerns prompted by the presentations? As I indicated earlier, it is not my place to judge whether the researchers have included in their reviews all of the previous research significant to their work. Presumably they have done so. I do have some concern that these research reports appear to ignore fiscal variables, except for some mention of levels of funding for specific categorical programs under Category III, School Level Variables. Some might consider the basic level of funding per pupil in a State or District as a major Category I variable. If you choose not do deal with the general funding issues, I recommend that you delimit your conclusions about the most significant variables influencing learning by pointing out that you reviewed little research that considered the effects of per pupil funding. You may want to indicate the obvious point that appropriate levels of funding would be necessary to provide the numbers of qualified teachers and aides and the quantities of good materials you report as critical to learning.

The precise explanations of research procedures and the attached bibliographies should permit readers to follow-up on any related questions or interests prompted by these reports. It would be beneficial to other researchers for you to also point out where the research is inconclusive and what additional research needs to be done.

Permit me to comment on the three papers as a whole, since I assume they will be published as a body of work.

Do these papers add to or simplify an educator's understanding of this research? The researchers clearly indicate that they have amassed and reviewed an impressive volume of earlier studies on school learning environments. The resulting identification of relevant research and the accompanying bibliographies will certainly assist other educators in accessing this body of research. The discussion sections are valuable to readers as a quick resource about the most critical variables. Each paper would be strengthened by the addition of clear and reasonably bold recommendations for application of the research findings.

Will these papers enable educators to improve learning environments? Both academicians and educators in the field who take the several hours required to read these materials will learn or reinforce their previous understandings about how to improve learning environments. The decision-making model you present is a helpful, but perhaps unnecessarily complex, approach to determining which learning variables educators in a given field situation should try to change. Because of the scholarly, formal style used throughout, and the probable dependence of the decision-making model upon factors which the individual classroom teacher does not generally control, teacher educators and some systems administrators are more likely to use the research findings model than are classroom teachers or building level administrators.

The authors should encourage wide use of these findings by suggesting important implications of their findings about common variables which affect learning in school, community and home environments and illustrating what changes in policies, processes and personnel might be required to change learning conditions.

Are the findings presented clearly and interestingly to busy educators? All of the project authors write well, telling the reader what is to be presented, how the research was conducted, and what the findings are. Each paper has sections which are somewhat redundant, however, and each would be improved by the use of one word rather than a phrase wherever possible. Having said that, I also recommend that the first usage of a specialized term, e.g. metacognition, be followed by an appositive definition.

Katharine G. Butler, Ph. D.

Effective Educational Practices: A Consensus on Learning

Temple University Center for Research in Human
Development & Education

This pamphlet listing all variables emerging from a "meta-review" of professional literature concerning the variables that are important to school learning, as well as a summary of consensus ratings from the field is of considerable interest and for the reader who moves carefully through the various tables, provides both enlightenment as well as raising some interesting questions, e. g. the lack of many significant state and district variables which might have been of importance but are not so rated. (Please note on page 2: is efficiency of transportation system item 10, or included under Item 9?)

On page 7, under student variables, questions arise regarding two items under Iv-E. Item 10, level of oral fluency, is interpreted I would suspect by most teachers to mean oral fluency in reading, rather than as oral fluency as in conversational management (e..g. dysfluency or stuttering). As such, item 10 deals with reading rather than oral (speech-language) skills. Item 11, Level of listening skills, probably does not deal with auditory and attentional parameters, but is usually interpreted by teachers as listening for directions, or following directions or instructions or responding appropriately to teacher questions. Item 12, learning styles, appears to represent a number of highly significant but conceptually different items, e. g. field independent or dependent, modality dependent (visual/ auditory) and high or low cognitive complexity actually refer to widely different phenomenon.

Item 24 on page 10 appears to have an omission--it currently reads: Good examples and analogies to concretize the abstract and familiarize the storage. One assumes that storage refers to storage in memory, and if that is the case, "familiarize"

WRITTEN COMMENTS Katharine G. Butler, Ph.D.

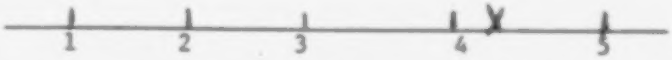
ADAPT: Scales for Assessment of the Accommodation of Differences Among Pupils by Teachers, by M. Reynolds

This reader found the ADAPT Scales to be of great interest, and only wish that more complete description of the conceptual framework and the research base were provided in this publication. I gather there is an ADAPT Manual that would provide whatever quantitative data there might be on the experimental use of these scales, and provide some idea of how the items may best be utilized in an item analysis beyond the global aspects of the level of implementation which is essentially a 5 choice scale.

If the scales are to be modified, this reader would suggest that:

1. All statements under procedures as well as in scales be full sentences, and case either in the affirmative or negative (preferably the affirmative). This would be a minor task and would increase the understanding of the items. For example, on page 8, three of the statements are sentence fragments while five are complete, with appropriate verbs in place. On page 9, item i is "rate of disturbing behavior by students. Does this refer to number? Temporal concerns?" Perhaps it is clear with the manual available, but is relatively muddy without its use.

   Page 19, last sentence in 4 is incomplete..."After each evaluation, subgroups based on ability to proceed at different rates and at different levels of the curriculum....." Should "are identified" be added?
2. Given the 5 point scale, it is possible that greater refinement on the ADAPT scale might be provided by running the levels something like this:



This would permit the user to indicate somewhat more closely how implementation was progressing. The example above portrays that the element falls within 5 but that there is still further work to be done.

Cumulativeness of data is indeed an ongoing concern and one in which governmental agencies or research institutions may be of inestimable value (as long as they do not control or constrain unduly individual researcher initiative.)

The authors of this article point out that "in all cases the research projects accepted the school system's special education classification of the student," (p.9) and then provide th comment that there is cause for concern, given the documented variability of classification systems. In fact, many classification problems and concerns are raised given that variability, particularly in certain areas of special education, such as learning disabilities. Statements provided by the JNCLD (Joint National Committee on Learning Disabilities) routinely begin with a caveat related to the heterogeneity of the group currently labled as LD. It becomes readily apparent to those who read the various state rules and regulations that the classification problems at the state level (or even at the school system level) seriously impact on the quality of research.

As the authors also indicate, applied research in field situations is a difficult process, as is collecting data for the study in question. The authors have begun a study which has implications for state and national policy as well as providing support for multiple methodology. The full outcome is eagerly awaited.

OPERATIONALIZING THE MARKER-VARIABLE SYSTEM: RESEARCHERS' SELECTION OF MEASUREMENT TECHNIQUES

S. Rosenfield, N. Zollers and S. Desiderato

This most interesting paper is in an initial draft stage, but represents an effort which of considerable importance to the field of education, i.e., how one one might best advance the cumulative effects of research within and between subfields or disciplines. The authors clearly describe their intent; it is not to constrain research, but rather to increase the applicability of individual studies addressing a specific area of interest. While, as they point out, Keogh's efforts have not met with universal success, the UCLA Marker Variable Guide is having increasing influence and has entered both the literature and the thinking of responsible researchers in the area of learning disabilities. Another example, drawn from an allied field, is the establishment of a data base at MIT through which researchers in child language may deposit their data and from which they may withdraw data, not only their own, but that of many researchers. A variety of systems for storing the data in accessible forms (thus also requiring that data be provided to that system in specific coding systems) has permitted researchers in child language (who typically deal in very small N's) to draw from much larger pools of similarly gathered data. A massive study of more than 500 subjects is now being entered into the data base, which combines the resources of researchers at the Harvard Graduate School of Education, those at MIT, and other university-based researchers; all at little or no cost to individual researchers. The MIT program is working well for the reasons that these authors cite, e. g., individual researchers may use combined data in a variety of ways, none are coerced to either provide or utilize the data, there are systems which permit multiple uses, and yet the data base is constrained in managable ways. Such a "marker system," if you will, demonstrates great potential for collaborate research or for individual use of well-gathered data by others.

WRITTEN COMMENTS Katharine G. Butler, Ph. D.

A DECISION-MAKING FRAMEWORK FOR DESCRIPTION, SELECTION, AND EVALUATION OF INNOVATIVE EDUCATION PROGRAMS

M. C. Wang, H. J. Walberg, and M. C.
Reynolds & S. A. Rosenfield

The decision-making framework of CMOVS is clearly delineated in this manuscript. It is to be hoped that it will lead researchers and practitioners to objectify their rationale for program selection. In fact, on page 5, it is suggested that the first line read: "Presently, there are few objective tools available to assist local schools/school districts..." Additional suggestions include rename Extra School Variables as External-to-School Variables, for greater clarity for the naive reader. The conceptual model is nicely designed, and the Figure 1. flow chart is of assistance to all readers. The additional tables are also of tremendous importance in making vivid the uses to which the decision-making framework may be utilized. For the majority of the items, or model presentations, the terminology reflects the intent and would be acceptable to all users. In view of the semantics of the framework, it might be helpful to look upon the Promotion Index as a Best Option Index, since the term "promotion" or the promotion or advocacy of a particular viewpoint may be viewed within an "advertising context" by some readers.

The manuscript is of considerable complexity in its underlying themas and should hold great promise for those who wish to become users/consumers of it basic precepts.

knowledge". Perhaps verbal language skills would have surfaced as a significant correlation in this work if other areas of research in allied disciplines had been sought; on the other hand, since must regular and special educators rarely have coursework that permits them to view their own teaching behaviors, those of their students, and the contents of the academic texts in analytic ways, it is not at all certain that it would surface. For those who follow what is occurring in regular education classrooms in the early grade levels, the movement to "whole language" as a "cure" for reading problems and as a symbol of emerging literacy indicates that reading and writing comprehension and production are viewed as important constituents of academic success. Unfortunately, the flight to whole language is based upon little or no understanding of its theoretical principles, with most regular educators settling for reading "big books", and otherwise engaging in explicit but unprincipled efforts to engage children in a language environment.

I wondered, as I read the discussion, if further comments might be made regarding the responses of the state directors of special education and regular education teachers on Table 5. For example, I found it fascinating that instructional variables were relatively unimportant to teachers, while classroom management and (one might assume) some notions of empowerment prevailed. Whether inferences can be drawn from the presumed distance researchers, experts, authors, and state directors from the classroom itself might be inferred, but since much of the research in education is conducted in classrooms it may be that ranking of the variables reflects differing perspectives rather than unfamiliarity with the setting.

Again, as was highlighted in the first sentence of these comments, this is an excellent manuscript and brings important information to the field of education.

WRITTEN COMMENTS

Katharine G. Butler, Ph.

THE KNOWLEDGE BASES FOR SPECIAL AND REGULAR EDUCATION

Maynard C. Reynolds, Margaret C. Wang, &

Herbert J. Walberg

Overall, an excellent manuscript, reflecting in a rational, insightful way the data collected in this study. I was pleased to observe the tenor of the discussion, and obviously, the results in term so correlational information is highly significant. There are two areas which I would like to address. On page 2, the authors refer to IQ (among other items) as relatively static or impervious to environmental influences, While this may be true in a very broad sense, I believe there is some data which suggests that environment does indeed play a role. Whether one wants to cast their lot with Sternberg or Gardner, or some variation on the theme of dynamic assessment ala Anne Brown and Joe Campione, or to retreat to the nature-nurture dimension of many years past, there remains evidence that intelligence, but whatever name 'tis called must be considered within the sociocultural context. In addition, socio-economic status (i.e., environment) has significant interaction with verbal and linguistic behaviors, and is related to literacy and academic achievement. The fact that these two factors were not considered is, of course, the choice of the authors; but the rationale provided might better be restated. Secondly, I would argue that "milder degrees of disability" (see also page 2) are characterized by language differences or disabilities, which are of much import to the data-collection process. There is a very large body of knowledge which has emerged over the past ten years which looks at the language of instruction and the language of teachers as well as the language of the text which provides grist for the authors' mill. While it is certainly understandable that a study such as this cannot attempt to measure all factors, it is possible that your data under "relevant student characteristics (p. 4), reading comprehension ability, level of general academic knowledge" both contribute to verbal ability and linguistic status as well as "declarative

Bibliographic References for the 179 Sources Synthesized in: What Influences Learning: A Content Analysis of Review Literature, by Wang, Haertel & Walberg

The above 179 sources stem from a research base which appears to be concentrated within the following publications:

Review of Special Education (primarily third or fourth): 9 citations
Designs for Compensatory Education Conference: 15 citations
Advances in Special Education (various editions): 19 citations
Adapting Instruction to Individual Differences: 1 citation
Handbook of Research in Teaching (various editions): 19 citations
Review of Research in Education(various volumes): 37 citations
First Lessons
Handbook of Special Education (various volumes): 21 citations
Annual Review of Psychology (various volumes): 12 citations
JSE: 5 citations
Exc. Children: 3 citations
Annual Review of Sociology: 3 citations
Adapting Instruction to Individual Differences: 10 citations
Effective Compensatory Education - 1 citation
Mainstreaming Learning and their Environment: 7 citations
Effectiveness Indicators for Special Education:1 citation
J. of Ed. Computing Research: 1 citation
What Works
Educational Leadership: 1 citation

While recognizing the advisability of moving to Handbooks and Annual Reviews, it would have been helpful to this reader if additional sources had been sought from relevant sources, such as the work published by Academic Press, Cognition and Instruction,Dillon and Sternberg , Metacognition, Cognition and Human Performance: Instructional Practices, Forrest-Pressley,MacKinnon and Waller, and various Springer-Verlag publications that deal with Cognitive Strategy Research: Educational Applications, Pressley and Levin, for example, or various Guilford publications. I am sure each individual who responds to this Reference listing would be interested in the search including their own favorites, and that it is true that the search could have probably been unmanageable if all resources were identified and synthesized. However, when addressing "What Influences Learning? A Content Analysis of Review Literature," it appears that the question is not fully answered in the literature cited above. However, given the task, yoemen's work is evident.

7. Can there be another reason for the comment that closes the first paragraph on page 16? That is, is it possible that the psychomotor variables scale, and the highest rated item ("psychomotor skills specific to area instructed" reflects more than a statistical artifact, but rather may draw from concern related to a specific population of children or on a perspective which reflects a specific interest in grade levels where psychomotor variables are more relevant? Are these interpretations as appropriate as a non-meaningful statistical artifact? Only those who have looked over the data might reach other conclusions.

8. Page 18, student characteristics: I too was pleased to see metacognitive items emerge as the most important variables, and would agree that metacognitive variables are indeed considered to be "alterable," and worthy of all the current investigations dealing with cognitive resource allocation and self-monitoring ala Flavell and others, and that this is much more appropriate than considering mental abilities to be immutable. The narrative however, might also acknowledge that there is a linkage between the past mental abilities literature and the current emphasis on the teaching of metacognitive strategies and that the research evidence is still coming in, and is far from complete. Thinking of the children who lie at one end of the continuum, those with severe/profound disabilities, instruction in metacognitive aspects of learning may be more limited. Perhaps these comments address a central issue: is the audience for this paper expected to include those who deal with individuals with handicaps as well as those who do not? If so the entire continuum of potential performance needs to be elucidated.

9. On page 19, first sentence at top of page. Should not the world positive be added, i.e., "reinforce the conclusion that consistent positive engagement with the subject matter to be learned is critical to school success? (One would wonder if consistent negative engagement would be critical to school success).

10. The summary of influences on school learning is well-taken.

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is the inappropriate verb. "Assist in storage in long term memory" might be more appropriate.

On page 11, VI-D, Item 1: correction required: unelaborated rather than unlaborated.

Stylistically, it is sometimes difficult to track visually (at least for those with trifocals) to which item a * or ** refers. Why not consider using 1 for being of high importance, and 2 for moderate importance. Readers would be able to scan the information much more quickly if this were done.

RECEIVED JAN 2[illegible] 1990

National Coalition of Advocates for Students
100 Boylston Street, Suite 737/Boston, MA 02116
617-357-8507
Joan McCarty First, Executive Director

NCAS

EXECUTIVE COMMITTEE

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Laurie Olsen
California Tomorrow

Vice Chair
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Coalition for Quality Education

Secretary
Debra Miller
Kentucky Youth Advocates

Treasurer
[illegible]
ASPIRA Association, Inc

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Advocates for Children of New York, Inc
New York, NY

Arkansas Advocates for Children and Families
[illegible]

ASPIRA Association, Inc
Washington, DC

Atlantic Center for Research in Education
Durham, NC

California Tomorrow
Oakland, CA

Center for Law and Education
Cambridge, MA Washington, DC

Children's Defense Fund
[illegible]

Citizens Education Center Northwest
Seattle, WA

Coalition for Quality Education
Toledo, OH

Designs for Change
Chicago, IL

Education Law Center, Inc
[illegible]

Institute for Citizen Involvement in Education
[illegible]

Intercultural Development Research Association
[illegible]

Kentucky Youth Advocates, Inc
[illegible]

Massachusetts Advocacy Center
Boston, MA

Mississippi Human Services Coalition
Jackson, MS

Multicultural Education Training & Advocacy
Somerville, MA Los Angeles, CA

National Black Child Development Institute
Washington, DC

National Council of La Raza
Washington, DC

Parents Union for Public Schools
Philadelphia, PA

Statewide Youth Advocacy, Inc.
Rochester, NY

Student Advocacy Center
Ann Arbor, MI

January 23, 1990

Dr. Margaret Wang
Center for Research in Human Development
and Education
Temple University
9th Floor, Ritter Hall Annex
Philadelphia, PA 19122

Dear Margaret:

First, I found the package of articles upon which you asked me to comment most interesting. As I mentioned when we last spoke, they are impressive both in the comprehensiveness of the material which is covered, and in the thoroughness and attention to detail. They focus at the precise intersection between instruction and diversity which is of great concern to this organization and its member groups.

John Kellogg and I reviewed the decision-making framework together this morning. The comments which follow came out of that discussion.

On the plus side:

1. The proposed methodology to guide school personnel in selecting among innovative programs is comprehensive. It considers a wide range of variables selected on the basis of research and expert opinion which are then weighted to either increase or decrease their impact upon the final calculation.

2. The range of weighted importance of the variables results from an examination of both special and regular education literature. Overall, if NCAS had devised the weighting system, I think that it would look about the same as this one does.

3. Operation of the evaluation system is fairly straightforward, requiring the evaluator first to decide which variables are present within a given program (choosing either an "o" or an "x"), then

probably isn't possible.)

While puzzling over how to lead the Woebegone Elementary School's Committee on Restructuring through this process, I oddly enough thought about the IRS Form #1040 which asks the user to complete various "schedules" in order to compute a single figure needed for a given line.

Another example which comes to mind is the simplified, programmed format which Jim Tucker used long ago in 19 STEPS (attached). Tucker's publication became available at a time when I was struggling to get a group of about 20 staff members in one school district to understand the complex issues involved in least-biased assessment. It relies upon a series of branching questions which reduce the decision at any given moment to a simple "yes" or "no" answer while still retaining most of the issue's complexity. School personnel were very relieved to find such an easy explanation. (That's why I proposed a similar format for Appendix B in New Voices.)

The attached issue of NCAS' "STEPS" newsletter demonstrates the simple checklists which NCAS has prepared to help parents assess various aspects of their local school's functioning. Unfortunately, given what it reveals about the level of sophistication of many public school educators, these very simplified publications are also purchased for their own use by teachers and administrators.

When NCAS staff prepared Criteria for Evaluating an AIDS Education Curriculum they imagined what might be most helpful to small groups of well-intentioned folks huddled in institutional-green rooms across the country feeling compelled to do something, but very unsure about what it should be. The subject is different, but the basic problem is the same: People who have only a fuzzy notion about how to restructure schools are being told to "go do it."

In the case of the "decision-making framework" the challenge seems to require that a long instrument be made even longer, in order to preserve its quality while also ensuring clarity. Maybe a "workbook" is the solution!

The need for a simplified instrument is great even though the idea does, as you have already confessed, make scholars feel nervous. Therefore, I hope that you will continue to work toward getting this material into a more accessible format. If you would like to meet sometime to discuss it further, John and I would be glad to participate in such a session.

I look forward to seeing you on February 8.

Cheers,
Joan
Joan M. First
Executive Director

CC: John Kellogg

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requiring a value judgement on a program's importance or feasibility (choosing either a 1,2,3). After some simple multiplication, point totals are added by column to indicate the ratings of various programs.

On the minus side:

1. The variable categories, although accurate and comprehensive, are, I believe, too difficult for the average building administrator to fully grasp. I base this conclusion upon my own experience doing technical assistance with medium sized midwestern school districts, and upon the consistency of the NCAS experience of having public school educators (principals and teachers) persistently seek order materials which were prepared for parents. They must order NCAS materials because of the easily accessible format, because the substance is often highly critical of schools. They could readily find the same substance elsewhere, in a more "educator-friendly" form.

I do not believe that the "average" building administrator or classroom teachers would carry out the initial task of selecting either an "o" or an "x" for each variable category. A choice would get made; however, it would not necessarily be an informed one.

2. There is also an assumption that the person operating the evaluation system (the "average principal or teacher") has a thorough understanding of major elements of each of the competing program options in order to record accurately how each program rates along the many variable categories. (i.e. "peer collaboration v.s. teacher collaboration". Once again, I doubt that the Woebegone Elementary School faculty will have this knowledge.

In my experience, program "models" are seldom clearly described by working educators. I think that the "local notion" of what constitutes a quality program falling in any of these categories is likely to be quite fuzzy.

3. The system does not set any standards by which to value the subjective variables. For example, just how is one to decide whether the amount of time spent on homework in a given school is "high" or "low"?

I can envision a publication in which:

1. The impact and purpose of each of the variable categories displayed in Table 2 are clearly explained. The current 10 or more pages of discussion about how the variables were developed needs to be condensed to a footnote or simple paragraph. This material might be replaced with place should go a single lucid paragraph marked by a bullet which explains why each variable (class of variables?) is important.

2. Basic elements of each innovative program option are clearly laid out, using concrete examples.

3. "Standards" or "ranges" are offered which help the person using the instrument to make informed judgement calls.

4. The evaluator is trained to use the system through a step-by-step example of a sample program evaluation. (Live training would be better, but

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Fifty Years of
Educational
Leadership
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January 18, 1990

Dr. Margaret C. Wang, Director
Center for Research in Human Development and Education
Temple University
9th Floor, Ritter Hall Annex
Philadelphia, PA 19122

Dear Dr. Wang;

Enclosed are the draft documents that you sent me along with my comments noted thereon.

I commend you for your efforts to assist in raising the effectiveness of teaching and learning in the nation's elementary and secondary schools. Your efforts to match what is known from research with what we know from successful practice should be successful, if your implementation process is not too cumbersome and time consuming.

It is to the latter that I have directed my comments. In some instances I have suggested more simplified wording. In a few cases, I have questioned the accuracy of assertions made. This was not done as a challenge to the writer's authority, but from the prospective of a teacher reading the document and deciding whether I would invest my time and energy in using it. In one or two cases, I raised questions as to whether the conclusion could be reached from the premise stated, (e.g., taking individuals from one random sample and matching them with others in the same building. This procedure certainly meets the test of convenience but does it meet the test of randomness? Admittedly, I do not know the answer to the question, but I believe you should consider it).

I appreciate the opportunity to work with you and I look forward to further collaborative efforts.

Sincerely,

Jeremiah Floyd
Associate Executive Director

JF:js

NSBA
LEADERSHIP FOR PUBLIC EDUCATION

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ASHA American Speech-Language-Hearing Association
10801 Rockville Pike • Rockville, Maryland 20852 • (301) 897-5700 (Voice or TTY)

January 12, 1990

Dr. Margaret Wang
Professor and Director
Center for Research in Human
  Development and Education
Ritter Hall Annex - 9th Floor
Temple University
Philadelphia, PA 19122

Dear Margaret:

Thank you for the opportunity to comment on your most interesting papers. I believe they represent a significant contribution to the literature on student learning in general. Additionally, they provide empirical support to the movement for greater collaboration between regular and special education. As you are well aware, while there is a considerable body of literature which discusses the pro's and con's of such collaboration, the literature focuses on its political, organizational and humanistic elements. Your studies provide research regarding student learning and instructional variables. This type of research in the long run provides the strongest arguments for supporting the "regular education initiative".

I did have some comments specific to each of the papers you shared with me. These comments generally fall into two areas:

- editorial comments: changes in construction or wording which I think may improve the clarity of the papers;
- substantive comments: regarding the content of the research and/or the implications.

Regarding the editorial comments, I've taken the liberty of making some suggested changes within the texts and am returning your papers to you with these changes noted in the document. I hope you can read my handwriting! I have retained copies here, so if you have a question or would like to discuss a point further, we can do so.

The substantive comments are in some part reflected in the editorial suggestions I've proposed, however, I provide a summary of these for each paper.

I've also enclosed the summary of my group's thinking at the "Invited Conference in Variables That Are Important to Learning" (along with the disc in case you need to transfer these into another document).

THE KNOWLEDGE BASES FOR SPECIAL AND REGULAR EDUCATION

COMMENTS: S. GOLDSMITH

1. Page 5: While I know its too late, I have a small concern about the methodology in which special education teachers were asked to select regular education teachers. Critics may say that teachers tend to select teachers that they are comfortable with, working with, and therefore who share mutual expectations regarding student variables.

   Rather than leave yourself open to the possibility of this emerging as a criticism, acknowledge the possibility of bias in teacher selection and discuss, in one sentence how it may explain why correlations between regular/special educators were higher than for other comparison groups (although all were clearly high).

2. This article focuses on issues of correlation, not the important variables in student learning. While I recognize the other articles focus on these variables, one cannot assume all readers will have access to all articles. In fact, you are likely to publish in different journals which address different cohorts. I suggest using a table or insert - early in the results section to highlight what these important variables are.

3. In your results you talk more about differences in expectations and less about similarities. The critical point in the findings are the similarities. I think you need to highlight this more in your results.

4. Maybe you're planning a collateral piece, but I think its worthy to discuss the findings in relation to pre-service training and in-service training as well. CSPD efforts--especially in-service--is of critical interest to OSEP as you know. Let me know if you need more help here. And if you're not planning a collateral piece, focusing on the implications for teacher training, rethink this. I think it's a good idea.

5. I've made some editorial changes in your Discussion on page 7 and 8 to strengthen the conclusions of your study. I believe your data is conclusive enough to make stronger claims regarding the implications for teacher training and student instruction.

6. I think also your abstract should include the last sentence of the study, which I've rewritten. This sums up why these findings have such significant implications and deserve attention in the abstract.

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BIBLIOGRAPHIC REFERENCES FOR SOURCES

COMMENTS: S. GOLDSMITH

No comments really.

Looks very comprehensive.

I've developed an interesting bibliography on the regular education initiative which dove-tails this one. I'll forward it to you as soon as my files from Massachusetts arrive down here. You might find it interesting.

teachers, CSPD coordinators, people experienced in local education program design) to create these products (within the framework of the information you present in your papers), would be exciting!

You have a richness of information here which needs to be better tapped. Its applications for program design and evaluation at a practical level can be considerable. If you decide to move forward with this I'll be glad to suggest some names I think might be helpful to you.

A DECISION-MAKING FRAMEWORK FOR DESCRIPTION, SELECTION AND EVALUATION OF INNOVATIVE EDUCATION

COMMENTS: S. GOLDSMITH

1. I'm having difficulty with the name of the decision-making framework: CMOVS. See my comment in the text. How about calling it: "Factors That are Critical to Student Learning" or "Factors Most Critical to Student Learning." The point is to chose a title that is meaningful in itself.

2. Page 2 or 3: Do you want to clarify early in the paper what population of students this research is relevant to? I know you mean all students, including those with certain kinds of handicapping conditions. Need early to establish the relevance of the findings for various constituents of readers (see my comments from "Invited Institute").

3. Page 9-10: Your analysis of factors grouped by interest to constituents is well done.

4. I'm not in total agreement with your analyses outlined as Table 2 regarding what variables are most directly related to an approach or program type, but that point is not critical for this paper. Program effectiveness indexes should incorporate (examine) all the variables, regardless of the specific program approach, and I believe you make this point. Additionally, people have the opportunity to determine for themselves, which among the variables is most important based on their program approach. This opportunity for self-selection is similar to a technique we employed in Massachusetts in creating a model and evaluation instrument for local school districts(or specific programs within districts)to use, and it proved quite popular. This technique is also incorporated into some of the program evaluation instruments created by ASHA to measure the effectiveness of clinical therapy programs. I'd be glad to talk with you about these.

5. As I'm reading this article I'm thinking of how it could be useful in a current project that the Professional Affairs Department at ASHA is assisting our Boards with--creating implementation guidelines for standards of program effectiveness. ASHA accredits college and university programs in the fields of speech-language pathology and audiology.

6. I think this is a good theoretical paper and the conceptual relationships between variables important to learning--program approaches--and evaluating program effectiveness is sound. However, I fear that the technical style in which the paper is written will prohibit practitioners (school administrators and teachers) from attempting to implement what you are proposing. As an addendum to this paper, or perhaps as a collateral piece, I think it would be helpful to take the next step and create some attractive, easy to read, user friendly evaluation instruments based on your research. Bringing together a group of practitioner-oriented stake holders (school administrators, parents,

WHAT INFLUENCES LEARNING?
A CONTENT ANALYSIS OF REVIEW LITERATURE

COMMENTS: S. GOLDSMITH

1. A really nice overview of the contrasts in the conceptual framework among various learning models.

2. Methods and Procedures is very clearly outlined--I can't think of anything which might improve it.

3. Page 9: Your point regarding frequency an item is discussed in the literature relative to its importance as a learning outcome is most interesting! While its really outside the scope of the paper, it might be interesting to incorporate some possibilities for why this is so within your discussion. It's a particular important issue for training programs. As you know both students and faculty often confuse the popularity of an issue with its importance. In addition, you can discuss this in the focused article I'm suggesting you do re: the impact of these findings in teacher training.

4. Did I miss it? I don't see any tests of significance regarding the relative ranking of the items. For example, is there a significant difference in the ranking between an item with a mean ratio of 2.3 versus 2.0? The issue of whether one variable is more important than another, or statistically rank equally important should be noted in the results and discussion. Of course, I'm not sure you can do what I'm suggesting due to the variance in cell size (statistics is not my forte!). There is value in the findings regardless of how it goes.

5. Your discussions are well done. You might consider expanding each of them in some future articles to focus on the interests of specific constituency groups. For example: your finding regarding the perceived importance of "out of school contexts" could be expanded into journal articles, presentations for parent groups. See my summary of the "Invited Institute" recommendations for more details.

Dr. Margaret Wang
January 12, 1990
Page 2

I apologize for the delay in getting this material to you--bouncing between Boston and Washington--closing out one job and starting another has been extremely time-consuming. However, things have started to become better organized and improving every day!

I hope that some of my thinking proves helpful to you. Do let me know if I can be of any more assistance. Hopefully we'll get to see each other next time you're down to Washington. Perhaps we can have lunch or dinner as your schedule permits?

Sincerely,

Sharon

Sharon Goldsmith, Ph.D.
Director
Professional Affairs Department

To: Margaret C. Wang
From: Barbara K. Keogh
Re: Review of Project Drafts

Taken as a whole, these papers make a significant contribution to the literature on mainstreaming of special education students. Their value is not limited to special education, however, as the content is applicable to most educational programs. Indeed, program designers and implementors of a range of programs should find the decision-making framework appropriate and useful. Similarly, selective use of subsections of the framework should be helpful for teachers in instructional and management planning and in self-evaluation. In short, my response to the set of papers is definitely positive.

Rather than respond in detail to each paper, I will focus my specific remarks on the major paper "A Decision-Making Framework for Description, Selection, and Evaluation of Innovative Education Programs" and on the "Adapt Scale." I emphasize, however, that the other papers are well done and useful. As examples, the listing of bibliographic references would be especially helpful to students and researchers of mainstreaming, and should be made available. A more fully developed paper on operationalizing a marker-variable system would contribute to the research and evaluation literature, and might also serve as a useful guide for graduate student researchers. I hope that the content of the project will be disseminated in a variety of accurate picture of program implementation because of the potential confounds in the scaling, particularly in the level descriptions. I suggest specifically that there be revisions in the level definitions or descriptors in order to reduce or to make explicit the underlying value base of the scaling, to ensure that there is consistency of content both within and across levels, and to reduce the amount of content which is dependent on rater inference.

I hope these comments will useful to you. Please feel free to telephone me if further discussion is needed. I appreciate the opportunity to read the drafts and to be a small part of this project.The findings as a whole should be a real contribution to the current "state of the art."

I have some problems with the "implementation" levels as presented, however. There are several major problems: the levels contain multiple variables or descriptors, the levels of "desirability" are not scaled in equal intervals, and the content is inconsistently value based and inferential. As example, Scale C-Social Environment (level 3) includes such items as "Students are expected to learn to work with each other but goals for group work are nonspecific," "Exceptional students often feel isolated." Both involve considerable inference from the rater. Further example, Scale D-Student Self-Directedness-(level 1), the class is "rule-governed...students have little or no concept of their participation in class management etc.."-(level 5) students ..."are expected to help to make the learning environment productive." These are global, descriptive statements which are difficult to observe and which require considerable interpretation from the rater. They also may get at different underlying characteristics of the instructional program; is it reasonable to scale them as shown? Final example, Scale J-Evaluation- (level 1) Evaluation ..."results are recorded as percentiles, percentages, or comparative grades..." (level 5) "All evaluation is specific to domains and mastery oriented." Is there not an implicit value statement here, and might not the evaluation format vary appropriately as a function of purpose?

In short, there are some problems with the content of the levels and the use of the scales as suggested in the ADAPT Profile Chart (p. 28). The Profile based on the levels as described may not yield an the use of the CMOVS in this way is not compelling. Perhaps the stakeholder applications could be treated as secondary rather than primary. The number of indexes may overwhelm practitioners, and some indexes seem more important than others. Perhaps it would help to include a brief paragraph relating selection of index to purpose?

(6) Finally, the discussion and conclusion section needs development, including linking back to the introductory notion of markers. Obviously I support the use of a marker system as a means of clarifying and ordering research and practice. The potential for comparative analysis of programs is an important extension of the marker notion. In the work reported here a number of salient and defensible CMVOS have been identified and defined. Their appropriate application across a variety of educational topics and across a range of educational purposes, including comparative evaluation of programs, should be argued vigorously.

Adapt

The stated goals of the ADAPT Scales are educationally relevant and important, and the scales address substantive areas of school programming. The subscales seem comprehensive and generally reasonable in content, their completion yielding a good picture of particular programs and schools. Researchers as well as program implementors should find these scales of value.

the Decision paper would be considerable stronger if some summarizing numbers about response sources were included. This would involve only a line or two in each respondent section, but would give the paper greater credibility.

(3) Understanding possible applications of the CMOVS (beginning on p.10) would be helped if there were an introductory "summary" section which included the number of markers and re-introduced the seven factors by name. As presently stated there is the possibility of confusion about levels--e.g. specific variables, categories of variables, and/or factors. Some framing introductory paragraph would help the reader sort out the CMOVS and, thus, increase the likelihood of application in the proposed Program Effectiveness Indexes.

(4) The Program Effectiveness Index is interesting and has real potential for evaluation purposes. I very much support the inclusion of importance in the Index, and suspect that this alone may provide insights for teachers and administrators. The illustrative programs (Table 3) are useful. A more differentiated discussion highlighting some of the differences might add to the example.

(5) The Desirability and Feasibility measures should also be of interest to program developers and implementors. I have less enthusiasm and less confidence in the Promotion Index and in the Stakeholders ratings. In a sense these seem artificial, a kind of pseudoscientific quantification, and compared to some of the other Indexes proposed they are less powerful. This is not to argue that stakeholders' views and perceptions are unimportant, but rather that

outlets and levels and will not remain captive in the archives of the Temple University Center!

Decision-Making Framework Paper (CMOVS)

This paper will be of interest to educators for planning and evaluation purposes, thus, meets the stated goals of the project investigators. In my view several things might strengthen the presentation and enhance the possible applications.
(1) The notion of "alterable" or "alterability" needs specification and discussion (p 5). Inferentially, of course, this means that "nonalterable" must also be considered. The utility of the proposed decision-making framework is closely tied to educators' ideas about what is or what is not alterable. Thus, some brief development of this issue seems important. The point is particularly important as views of "alterability" may vary among educators, and decision making is an individual process, even when carried out within this framework.
(2) Although this paper is clearly a summary statement, the argument would considerable strengthened if more information were provided about the "stakeholders" or participants in the development of the CMOVS (pp 6-8).e.g. How many project directors, state directors, teachers, or school psychologists were contacted and what were the return rates for particular subgroups or for the respondents as a whole? This information is covered in detail in one of the papers but many readers may not have the chance (or possibly interest) to examine the specifics reported there. Yet the argument contained in

The University of Kansas

Special Education

December 22, 1989

Margaret C. Wang, Director
Center for Research in Human
Development and Learning
Ritter Hall Annex, Ninth Floor
Temple University
Philadelphia, PA 19122

Dear Margaret:

Following are my comments on each report and a concluding statement on the project.

The Knowledge Bases for Regular and Special Education

Well-conceived study that makes a very important argument in a novel way, i.e., if regular and special teachers think and act the same relative to teaching and learning, why are they trained separately. This can be extended, as you have done to a degree, to, why should they work separately in schools. Ultimately, this line of argument could lead to the question, why are these students treated so differently in school.

Effective Educational Practices

Very helpful quick reference for school learning factors. Particularly useful for researchers and developers when used in conjunction with "What Influences Learning?" content analysis.

What Influences Learning? (Content analysis and references)

Very well done review of an impressive body of literature. I am particularly taken by the degree to which this literature supports a more integrated approach to schooling. I hope you plan to publish this.

Adapt Scale

This is a very useful document, particularly for self-study purposes for teachers and entire buildings interested in more appropriate levels of accommodation. The fact that it is in a "scale" format may cause some to misuse it, but overall I think

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it can be a very positive assessment device. I would use it as a stimulus for discussion among a school staff as a vehicle for restructuring.

Operationalizing the Marker-Variable System

Very important report. The fact that a marker-variable system can help coordinate research efforts, but that such systems are not used extensively in the field suggests to me that what you've put together here will be very helpful in promoting the marker-variable idea. There is much in the report that promotes understanding of the concept, makes a strong case for its use, and provides helpful suggestions for facilitating its implementation.

A Decision-Making Framework

This, I think is the capstone piece for all the other papers in the set. It provides a useful guide for the application of all the ideas and procedures laid out in the other work. Too often we provide such material and leave it to the field to figure out what should be done with it. This paper compensates for that problem relative to your work. It is an essential umbrella for the entire project's workscope.

Overall, I am very impressed with the thoroughness with which the project has been completed. I think your approach has been very systematic. SI am particularly pleased with the way you have surveyed what is known in the field, brought it together in a meaningful way, and then encapsulated it in an overall framework for direct application by potential users. This is rare for our field. You and your colleagues are to be commended for your effort, insight, and ultimately, for your positive contribution to the field.

Best wishes for a good new year!

Sincerely,

Thomas M. Skrtic
Special Education

tms

Enclosures

Counterpoint

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December 27, 1989

Margaret C. Wang
Professor and Director
Center for Research in Human
  Development and Education
Temple University
Ritter Hall Annex/9th Floor
Philadelphia, PA 19122

Dear Margaret.

Thank you very much for the opportunity to review the truly superior outcomes of the project on school learning environments for effective mainstreaming. I am most favorably impressed with this work, and I can find nothing to criticize and much to praise. In fact, the papers are generally so useful that I really don't feel I have earned the honorarium but, rather, have gained a great deal just by reading them. My remarks are as follows.

* A DECISION-MAKING FRAMEWORK FOR DESCRIPTION, SELECTION, AND EVALUATION OF INNOVATIVE EDUCATION PROGRAMS (Wang, Walberg, Reynolds, and Rosenfield). Coupled with the ADAPT scales, this work makes great strides in objectifying and streamlining the school improvement and evaluation process. The framework should serve a number of purposes within schools, and both the framework and the ADAPT scales are models that could be used to devise other frameworks and scales for other purposes in education.

* ADAPT SCALES FOR ASSESSMENT OF THE ACCOMMODATION OF DIFFERENCES AMONG PUPILS BY TEACHERS. Besides the above remarks which join the scales with the framework in their applications, I found the ADAPT scales to be extremely useful and to show a great deal of work in devising an appropriate continuum of implementation within each scale.

* THE KNOWLEDGE BASES FOR SPECIAL AND REGULAR EDUCATION. Being familiar with the background on this, I am pleased to see the final outcome. This will be of value in the work of various groups on a knowledge base and subsequent competency statements. With your permission, I would like to send this and several other parts of your package to the TED task force that is currently examining competencies for special and general education personnel involved with special-needs students, as I believe it will expedite their work to have access to yours.

* EFFECTIVE EDUCATIONAL PRACTICES: A CONSENSUS ON LEARNING. As the background for the knowledge bases, this is also useful in development of competency and practice statements.

* WHAT INFLUENCES LEARNING? A CONTENT ANALYSIS OF REVIEW LITERATURE, and BIBLIOGRAPHIC REFERENCES FOR THE 179 SOURCES SYNTHESIZED IN: WHAT INFLUENCES LEARNING? I am glad you included these two reference sources, which will be helpful to others involved in development statements on competency and practice.

* OPERATIONALIZING THE MARKER-VARIABLE SYSTEM: RESEARCHERS' SELECTION OF MEASUREMENT TECHNIQUES. This paper suggests that a technical assistance system should be developed to assist districts, states, and schools in using the materials you have developed for improving general education programs for students with special needs. I would urge you to consider this as a new option. (Table 2 was missing from my copy, but this did not interfere with my review in any substantial way. There are a few typos also, e.g., para 2, page 5: Moreover, there is increasing interest in the way that given professionals THINKS about their work.

I am proud to have been associated with these efforts, Margaret. I am not sure of what the future may hold in terms of the "regular education initiative" of the Will administration, but I would certainly suggest that you and Maynard and your colleagues have gone beyond that with these outcomes. It might be a good idea for your efforts to venture into the overall school reform and restructuring arena and not remain confined within the earlier initiative. It is within the overall school reform agenda that I see the real value of these materials.

Congratulations on what you have accomplished and best wishes for continued success in 1990.

Very truly yours,

Judy Smith-Davis

State of New Jersey
DEPARTMENT OF EDUCATION
225 WEST STATE STREET
CN 500
TRENTON, NEW JERSEY 08625-0500

December 22, 1989

Dr. Margaret C. Wang, Professor and Director
Center for Research, Human Development and Education
Temple University
9th Floor Ritter Hall Annex
Philadelphia, PA 19122

Dear Margaret:

Per you request of December 12, 1989, I have reviewed the final drafts of the papers that report findings from the project "Designing and Evaluating School Learning Environments for Effective Mainstreaming of Special Education Students: Synthesis, Validation, and Dissemination of Research Methods." My comments for each paper follow:

1. "A Decision-Making Framework for Description, Selection, and Evaluation of Innovative Education Programs"

    - The greatest advantage of this paper is that it identifies, in great detail, all of the variables that must be considered when deciding on the implementation of new programs.

    - I believe this approach would be highly useful to practitioners because it carefully operationalizes the program selection process. In the past as well as currently, many program decisions are based on hunch, "feel" or unsubstantiated recommendation.

    - The entire process may be a bit too complicated for some people. This may result in their refusing to use it. It would be interesting to have a short form as well as a long form.

    - The multiple indexes are very helpful, particularly because the user would have the flexibility to choose from any of them to meet his or her own needs. I found particularly useful the indexes that include implementation, stakeholder and desirability indicators.

New Jersey Is An Equal Opportunity Employer

2. "Scales for the Assessment of the Accommodation of Differences Among Pupils by Teachers"

   - This approach holds great promise in that it operationally defines, in an exhaustive manner, the instructional variables that are of critical importance, particularly in "flexing" the instructional environment (e.g., curriculum) for exceptional children.

   - However, I found it to be rather complex, cumbersome, and unclear in its directions. For example, it is not clear how one arrives at the ADAPT profile chart on page 28 and it is also not clear how one would use that chart to make instructional decisions.

3. "The Knowledge Bases for Special and Regular Education"

   - The finding that starts at the bottom of page 7 and goes on to page 8 that "Hypothesizing about 'underlying processing deficits,' or some such procedure for specifying remote dispositional states is a mistaken approach" is in my view, very significant in that our special educators over the past 15 or 20 years have invested a lot of time and resources in this mistaken assumption. Also, the finding on page 8 that "instruction be based on factors quite directly observable and manageable in the learning environment" is equally important. These two conclusions should, I believe, serve as guiding principles for our special educators.

   - Simply stated, the study "feels good." For example, the finding that school principals rate background factors such as family interests in education as high in importance makes sense.

   - The finding on page 6 that teachers tend to rate their own authority to make decisions as highly influential in learning is something we have found also to be true in our pilot project, The Plan to Revise Special Education in New Jersey.

   - I have some problem with the method for selecting regular education teachers to participate in the project. On page 5 it is noted that each of the special education teachers was asked to recruit the regular teacher whose classroom was nearest to his/her own classroom. On page 7 it was concluded that "there is remarkable similarity among special and regular education teachers about what variables or principles of instruction are important." I wonder if these results are somewhat tainted because of the possibility that there was a systematic selection of "good" regular teachers, at least in terms of their tendency to agree with those special education teachers who selected them.

4. "Effective Educational Practices: A Consensus on Learning"

   - When I filled out the questionnaire, I recall feeling somewhat frustrated because of the amount of overlap among the items within each category. This does not necessarily effect the validity of the results, but it could create some confusion for the user of the document.

   - The pamphlet holds great promise in that it is very thorough in describing variables that are important to school learning. On the other hand, the introduction to the pamphlet should be expanded or there should be a discussion section at the end to help the reader more fully understand the meaning and use of the pamphlet.

5. "What Influences Learning? A Content Analysis of Review Literature"

   - This paper is definitely of great assistance in its orientation toward practical school improvement strategies.

   - There is an extremely important finding on page 10 that the really important stuff in education goes on between the teacher and the pupil. This runs counter to the conventional wisdom that external factors have the greatest influence on learning.

6. "Bibliographic References for the 179 Sources Synthesized 'What Influences Learning' A Content Analysis of Review Literature"

   - I have no comments on this bibliography.

7. "Operationalizing the Marker - Variable System: Researcher's Selection of Measurement Techniques"

   - Information is still being gathered for this report. That fact, coupled with the somewhat confusing writing style, makes it difficult to follow the report. Unlike the other papers, this one still need a lot of work.

Thank you for offering the honorarium. Because of restrictions within the New Jersey Department of Education, however, I will not be able to accept it.

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December 27, 1989

To: Margaret Wang

From: Dan Reschly

RE: Review of Project Reports and Products, Temple University Center for Research in Human Development and Education

Margaret, I will make comments on the individual documents and reports, then provide some overall impressions of the work.

Document 1: **A DECISION-MAKING FRAMEWORK FOR DESCRIPTION, SELECTION, AND EVALUATION OF INNOVATIVE EDUCATION PROGRAMS**

I was impressed with the thoroughness of the review and identification of the Consensus Marker-Outcome Variable System. It appears that everything is there. My major concern is the need to simplify the long lists of variables so that their application to school reform would be more comprehensible for the typical change agent (school board member, principal, teacher). In the present form, I am afraid the intended consumers might be overwhelmed. Is there any way to combine within the main categories?

I am always pleased with the emphasis in your work on social competencies. I believe that we share the conviction that social competencies are crucial educational outcomes.

At about p. 8 you might provide more information on the methodology used to establish the seven factor solution. There were six broad categories in the judgmental analysis of the CMOVs, but seven factors. Further explanation of the difference would be useful. Did you consider using a confirmatory factor analysis to determine if the six judgmental categories provided a justifiable factor solution?

My only other comment is a small detail. On the last page, in Category H, the items on cohesiveness and competition seem to be contradictory. The concepts are not necessarily incompatible, but some further explanation for both might clarify what you mean.

Overall, this is an impressive synthesis of the available knowledge.

As usual, Margaret, I have enjoyed working on this project with you and I look forward to more of the same in the future. Please do not hesitate to call on me if you have questions or need more information.

Sincerely,

Jeffrey V. Osowski, Director
Division of Special Education

JVO/pc:1/5497k

p.4

Document 5: OPERATIONALIZING THE MARKER-VARIABLE SYSTEM: RESEARCHER'S SELECTION OF MEASUREMENT TECHNIQUES

I was intrigued by this study, but cannot provide much in terms of review since the findings were incomplete and preliminary. Excellent examples were provided of differing measures for the same construct, e.g., time on task. Studies of the comparability of these measures would resolve some of the problems, but some conventions among researchers regarding the nature of, and the conditions underwhich, time-on-task measures are be used would improve the literature considerably. Perhaps the further pursuit of this project will look at the variables that need to be "standardized" in terms of common meanings and comparable measurement procedures. Further discussion of the results of prior marker variable efforts might be useful. For example, how did the Head Start/Follow Through reach consensus regarding meaning and measurement operations?

Documents 6 and 7: BIBLIOGRAPHIC REFERENCES... AND EFFECTIVE EDUCATIONAL PRACTICES: A CONSENSUS OF LEARNING

These documents provided useful reference information, but there is no point in reviewing them other than to note their usefulness.

SUMMARY:

The primary impression that I have reached is that there is much that is known about effective instructional practices with non-handicapped, "at-risk", and handicapped students. There is a substantial gap between what is known and what is typically implemented in the schools. The next steps involve both improving the knowledge base and mounting large-scale efforts to implement what is known. The project reports reviewed here contribute crucial information regarding what is known. The information is organized such that guidance is provided to reform efforts. The further development of more effective educational programs for students depends on utilization of this knowledge.

p.2

Document 2: ADAPT: SCALES FOR ASSESSMENT OF THE ACCOMMODATION OF DIFFERENCES AMONG PUPILS BY TEACHERS

This was a most impressive document. I hope that you will have the time and energy to pursue further development of this set of scales. I would be especially interested in the investigation of inter-judge reliability information. The use of the scales in a time series analysis of teachers and schools pursuing regular and special education reform plans would be highly useful for promoting reform and for further establishing the construct validity of the scales.

My comments on each of the scales as I reviewed them was "good" or "excellent." I have some specific remarks about several of the scales. I suspect that Scale C is likely to be implemented least in current classrooms. A considerable amount of work is needed here, if Iowa classrooms are typical. The content on Scale 4 seemed to be a mixture. It seemed to me that the content in items c., d., e., and f. might fit better in Scale G. Regarding Scale F., I think that level 4 implementation would be a huge improvement over current practices. Level 5 is certainly a worthy, if presently distant, goal. On Scale I, you may wish to provide more regarding high achieving and/or gifted students. You may want to consider placing more emphasis on acceleration within content and grade skipping acceleration. The evidence on the latter is nearly uniformly positive. On Scale L, I would recommend more emphasis on problem-solving assessment, which has the features of collecting information in the natural environment; using assessment procedures that have direct applications to designing, monitoring, and evaluating interventions; use of clearly stated questions developed with the referral agent(s), etc. Some categories or assessment approaches might be listed such as academic survival skills, adaptive behavior, behavioral assessment of social skills, curriculum based assessment, curriculum based measurement, and so on.

This is an exemplary product that I hope will receive further attention in the literature and in practice. Congratulations to Maynard for a superb contribution.

Document 3: THE KNOWLEDGE BASES FOR SPECIAL AND REGULAR EDUCATION

It is difficult for me to provide a critical review of this paper since the author's conclusions are virtually identical to my views. I suggest even more stress on the common principles of effective instruction and the problems associated with pull-out programs. I am particularly supportive of the emphasis on the alterable variables rather than internal child characteristics. The use of this information in assessment and diagnosis of learning problems, envisioned on p. 7, is a glimpse of the future that I hope for school psychologists. I have to admit to meeting a "couple" of skeptics from among my colleagues in the Iowa reform efforts. This paper and the other documents in this series

p.2

will significantly augment the credibility of our reform efforts.

You might consider further discussion of the level of instruction variable as one of the major challenges in special education. Level of instruction becomes increasingly difficult with certain types of mildly handicapped students at the upper grades. Students now classified as mildly mentally retarded exhibit achievement differences by the 6th or 7th grades that are extremely difficult to manage in a regular, heterogeneous classroom. Furthermore, the decisions concerning curricular goals become increasingly difficult at the upper grade levels. Is integration of mildly handicapped students partially dependent on the age and the degree of difference from average levels of achievement?

Again, an excellent contribution to the literature.

Document 4: WHAT INFLUENCES LEARNING? A CONTENT ANALYSIS OF REVIEW LITERATURE

This appears to be a methodology paper that provides the background for other papers. The brief historical overview was interesting and provided an excellent introduction to the synthesis. My copy was missing p. 3, so I cannot review the content there. I was convinced that the selection of sources was sound and that the synthesis was objective. However, I had trouble following the determination of the strength of the influence on learning. To what extent were these strength indicators personal testimonials as contrasted with syntheses of empirical studies? Perhaps some further description of the strength indicators and, perhaps, a differentiation of the testimonial vs. empirical sources of evidence be provided.

The contrasts with the "conventional" wisdom, a la Coleman, was quite effective. That contrast could be stressed even more in my judgment. The crucial task now is to convince the various publics that a number of alterable variables DO make a difference, and that personnel and organizational variables need to be designed to maximize the effects of those variables.

I can't leave this section without making the observation that the Category IV variables of cognition and metacognition are highly related. I wish that were not the case. It would make remediation of the achievement problems of students with mild mental retardation much easier if those two variables were independent. The review by Campione, Brown & Ferrara in Sternberg (1982) is excellent regarding those relationships. Some revision of the discussion at the bottom of p. 18 might be considered in view of the relationship between cognition and metacognition.

Overall, another excellent contribution.

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ALBERT SHANKER
President

December 29, 1989

Dr. Margaret Wang, Director
Center for Research in Human Development
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Temple University
Ritter Hall Annex
Philadelphia, Pennsylvania 19122

Dear Margaret:

Enclosed are my comments on the final drafts of the papers from the "Designing and Evaluating School Learning Environments for Effective Mainstreaming of Special Education Students" research project. In general, I found them to be informative and practical, and when implemented, will be extremely useful for evaluating school programs and practices.

The following are specific comments on selected papers.

"A Decision-Making Framework for Description, Selection, and Evaluation of Innovative Education Programs"

This is a very necessary piece of research. The Consensus Marker-Outcome Variable System enables decision-makers to make informed choices for decisions affecting program development, implementation and evaluation--especially in these times of limited and competing resources.

The CMOVS will be useful to school decision-makers in the following ways:

1) It will raise the "consciousness" of those decision-makers by giving them a framework, beyond standardized test scores, in which to evaluate the effectiveness of educational products and/or programs;

2) It takes into consideration the range of variables that affect each factor related to teaching and learning rather than looking at specific factors in isolation--this wholistic approach is similar to the integrated approach to the curriculum that shows the interrelatedness of one subject (variable) to another;

3) By showing how to calculate the various indexes, the CMOVS provides a quantitative, as well as qualitative, basis to support a decision to implement or discard a program.

The following are obstacles I see facing the implementation of the CMOVS:

1) awareness - making practitioners and policy-makers aware of the need to conduct this type of analysis before deciding to implement a program;

2) dissemination - making practitioners and policy-makers aware that the CMOVS exists; and,

3) training - appropriate training and follow-up to insure proper usage of the system.

"Operationalizing the Marker-Variable System: Researcher's Selection of Measurement Techniques"

Now that educators agree that there is an evolving pedagogical base for teacher education, this paper serves to alert us that some of the inconclusive findings in educational research are due to differences in methodology rather than lack of a scientific knowledge base. The identification and use of consistent marker variables among education researchers that align one study to another, as proposed in this paper, will certainly make research more meaningful and useful to the practitioner.

As the profession identifies a general knowledge base to which all potential teachers should be exposed, it is important that differences in research results are not due to inconsistencies in research methodology.

Practitioners and policy-makers should be aware of the Marker-Variable System and use it when analyzing research results for decision-making purposes.

"The Knowledge Bases for Special and Regular Education"

The information presented in this study has important implications for teaching, learning, teacher preparation, and the way schools are currently organized and governed. The potential impact for providing services to children in special education, Chapter I and other "pull-out" programs is tremendous in light of the school restructuring movement where many are looking for ways to enhance learning and improve the delivery of services to special needs students as well as those in regular education.

The attention given to focusing on the learning needs of the individual student rather than labelling students by "process deficits" can alleviate much of the over-representation of minorities in special education for reasons other than physical and/or mental disabilities, and can slow the crescendo of students being identified as in need of special services.

The fact that the study focused on alterable variables that address the practical realities of the classroom should make the findings in this study more relevant to the practitioner.

"What Influences Learning? A Content Analysis of Review Literature"

The methodology and procedures used for this study appears to be well thought out and thorough. I was impressed by the extensive research that was conducted to identify the variables important to teaching and learning. This compilation of research which provided the conceptual framework from which the Consensus Marker-Outcome Variable System was developed has synthesized the findings of several categories of research and provides a good overview for the practitioner.

"ADAPT: Scales for Assessment of the Accommodation of Differences Among Pupils by Teachers"

The ADAPT scales as they are presented appear to be very effective models to use to evaluate individual classrooms, schools, programs, and possibly entire school districts, especially since more attention is being focused on restructuring schools and cultural diversity. In addition to pointing out some weaknesses in a program or school, the scales also provide ascending levels of improvement to strive for.

I would like to suggest that for Scale A: Space, Facilities, and Furnishings, the following element be added:

h. Maintenance - is the physical environment clean and visually aesthetic (no peeling paint, graffiti or water leaks); is it comfortable (appropriately warm and cool); and is it safe (asbestos-free, etc.)?

Thank you for giving me the opportunity to participate in the project. I hope my contributions will facilitate bringing the project to a fruitful end.

Sincerely,

Carolyn

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December 20, 1989

Dr. Margaret C. Wang
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Dear Margaret:

I have read the final drafts of the papers that report findings from your project, "Designing and Evaluating School Learning Environments for Effective Mainstreaming of Special Education Students: Synthesis, Validation, and Dissemination of Research Methods." I would like to share with you and your staff a number of observations on the papers. In the letter that follows, I have provided you with comments and feedback on the papers. I have done so in the order in which I read the papers, because that had a very significant effect on my observations. Having read the entire set, my observations on one of the papers might change.

I would like first to comment on the paper, entitled "A Decision Making Framework for Description, Selection, and Evaluation of Innovative Education Programs." I read this paper first, and I wrote the review before reading the other papers. I have prepared this final copy after reading the other papers, and some of my concerns might be modified. However, I think it is important that you see the kind of reaction I had to this paper as a stand-alone document. The paper definitely is not a stand-alone document. I read this paper three times, and sections of it more often than that. I am incredibly confused. This paper is very, very difficult to read and understand. I had considerable difficulty understanding what was done, why it was done, and how I or an administrator might use what was done. I still cannot decide whether the content of the paper is conceptually too complex, whether you have covered the ground too rapidly, whether you have assumed too high a level of entry knowledge, or whether the sentence structure is too complex. And, of course, I did keep asking myself whether I was just being dense! In any event, check very carefully how others react.

In this paper you argue that there is no lack of ideas on what to do to improve current practice, but that there is a pressing need to find ways to systematically synthesize and use what we know that works. You argue further that schools look to external training and technical assistance programs for staff development and support in three areas (curriculum and instruction, administration, and knowledge about the "outside world").

me in the "decision making framework" study. The authors argue that there are many distinct influence on achievement, and use a variety of techniques to ascertain which are important. First, I am impressed with the magnitude of this undertaking. The review task was a Herculean effort. Second, and perhaps more importantly, you lost me a few times throughout this paper. I am not one who has spent time doing the kinds of analyses reported herein (ranging from armchair groupings to pretty elaborate quantitative syntheses) so I just have no way of making judgments about about the accuracy of what is reported.

On page 9, paragraph 1 was very confusing to me. I followed most of the discussion section. The middle paragraph on page 18 is too sweeping. The paper would be strengthened by addition of a summary.

The third paper that I read was the one entitled "Operationalizing the Marker Variable System: Researchers' Selection of Measurement Techniques." I read this paper with interest, though you need to know at the outset that I am reasonably convinced that what is being attempted is nearly impossible. I am pleased to see you folks engage in an effort to identify the kinds of measurment technology used in these major projects, but I am a bit skeptical about whether or not much can come of this.

I am still confused by your sample. I participated in the phone interview. Prior to be interviewed, I thought I was being interviewed about the project I just completed looking at the effectiveness of alternative instructional arrangements for students who are handicapped in regular education settings. Rather, the interview focused on my current project, the Student Learning in Context Model project. So, I was interviewed about a project which is really in its initial stages, and I was caught a bit unprepared.

It is probably important that you know that you are getting only part of the picture from researchers. For example, when I was asked to identify the variables on which we are gathering data, the kinds of measures we are using to gather data, and the reason why we chose those measures, I reported the major variables on which we are gathering data. I did not report, for example, that we are gathering data on a host of demographic variables. We are. So while it will look like we do not gather those data, we actually do. I read this paper as it was intended, as a very preliminary paper. I have some major questions regarding the extent to which this activity is going to be useful.

The fourth paper I read was one entitled "Effective Educational Practices: A Consensus on Learning." This is a good paper, in which I really have no major questions. The paper helped me understand the first product that I read.

The fifth paper I read was the one entitled "Knowledge Bases for Special and Regular Education." This really is again a very good paper and one that I found very helpful. I think that in this form, the paper is probably ready to go for publication consideration. I would modify the abstract a bit so that you indicate a high degree of consensus among regular and special educators. This paper I understood. It was a nice, clean, clear paper.

CMOVS is designed to help educators in selection, design, and evaluation of educational programs. I concur fully with the need for development of a system to enable folks to design, develop, select, or evaluate curricular innovations. Yet, on my initial (three time) reading of this document, I just don't know how I would use it or the information included. Let me list the questions I found myself asking as I read this paper.

1. If schools' needs are for staff development and support, how will CMOVS provide help? You say that CMOVS will provide a conceptual basis for systematic documentation and evaluation of educational approaches/practices in ways that can be of help. Sounds a bit jargony to me. How?

2. I was confused by Figure 1. Why are variables grouped as they are? Why not Home/ Family variables, for example, grouped with Parental Expectation?

3. In Figure 1, where do school organizational variables (like Teacher Participation and Curriculum Planning) fit?

4. How was the factor analysis completed? What data were input? Specifically, why was it done?

5. What is the basis for the factor names on pages 8 through 9 and in Table 1?

6. In Table 2, it looks like the variables listed are from major headings of the "master list of variables." Why just the headings?

7. Where did you get the numbers assigned to headings in Tables 2 to 5? Did "experts" rate the headings? On page 10 you just state that "the specific waitings are based on consensus from the field."

Obviously, I had considerable difficulty following the first paper. If I had read the paper last, then some of those questions that I've raised above would have been cleared up. The short of this is you just have not communicated to the reader what this decision making framework and process is all about. I am convinced that in its current form, this document would not be used and that considerably more information is needed. I would strongly suggest that you significantly beef up the method section of the paper so that people can understand much more specifically what was done and why it was done. I do believe the paper also would profit much from a string of examples in which you illustrate how to use the decision making framework.

Finally, it looks to me like readers are going to have to be provided with an analysis of the major headings out of your tables and all of the little pieces that go into those headings, somehow see the importance and rationale for looking at all of that stuff, somehow understand the relevance to their own situation, before they are going to even begin to be able to use the framework.

The second document that I read was the one entitled "What Influences Learning? A Content Analysis of Review Literature." I read this paper after reading the one above, and I gained information that helped me understand a bit some factors that were confusing

The final document I read was the one entitled "ADAPT: Scales for Assessment of the Accommodation of Differences Among Pupils by Teachers." I found this a very interesting endeavor, which clearly involved a lot of work. I was pleased to see the format of the scale, and I think that this document will be very useful to educators. You will probably run into the same difficulty we have with a scale like this. I am finding that educators reject such efforts out of hand because they look like they involve a lot of work and they require that people move into classroom situations to observe children. That is not your problem, but it is a sad commentary on the extent to which we can bring about change in this field.

I sincerely thank you for the opportunity to review these papers. I think you have a bit of a mixed bag here, and perhaps a few major problems. I do hope that you find my comments constructive.

Sincerely,

James Ysseldyke

James E. Ysseldyke, Ph.D.
Professor of Educational Psychology

JEY/sh